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WHEAT'S IMPROVED TANNING APPARATUS

Tanning Apparatus.

The accompanying engravings illustrate an improved apparatus for tanning leather, invented by Jesse S. Wheat, of Wheeling, Va., who makes the following statements in relation to it :—

"I have my tanning process in full operation in this city, tanning leather in one-tenth of the time required by the old process, and I warrant the leather to be of the finest quality for wear. This process combines the handling or moving of the hides in the liquor, the circulation of the liquor through the vats the pressure upon the hides, and the circulation of the liquor through the tan bark in the leaches, all at the same operation ; and the operation may be suspended upon one or more of the vats while it is continued in the others. Therefore, among its advantages, in addition to the short time consumed in tanning leather, is the great saving of labor."

Fig. 1 of the engravings is a perspective view of the apparatus and Fig. 2 is a horizontal section through the middle of the vats combined with a horizontal section through the several reservoirs.

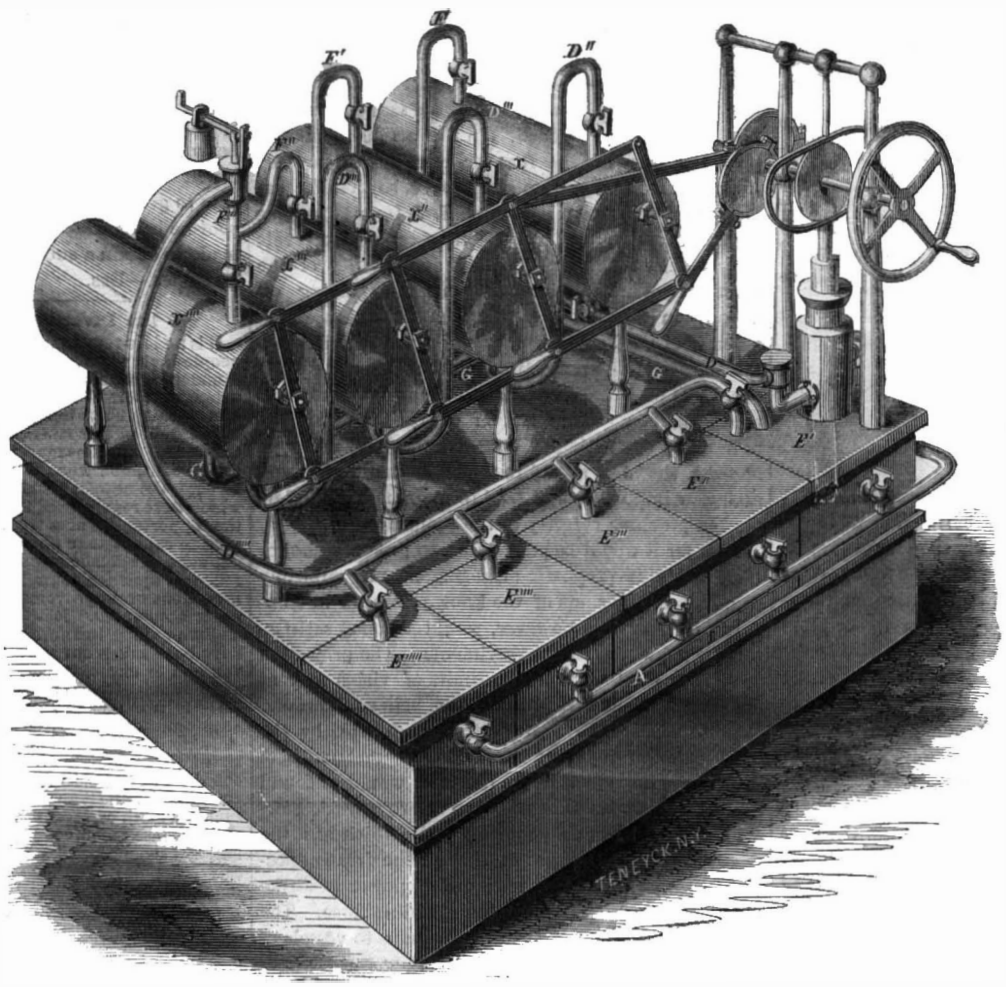
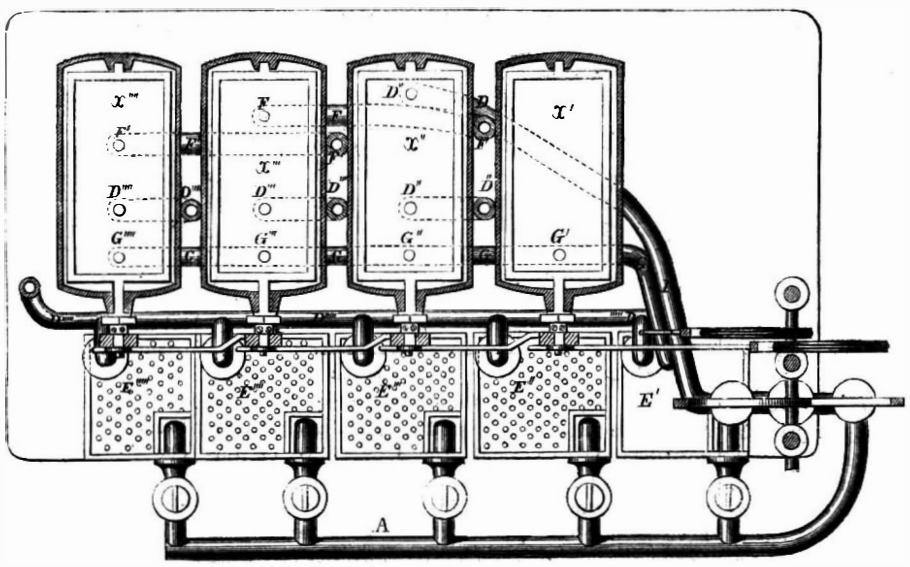


Fig. 2



The leather is placed in the air-tight cylindrical vats, X X″ X‴ X,⁗ and the tanning liquor which is prepared by mixing water with bark in the rectangular reservoirs, E″ E‴ E⁗ E⁗′, below, is made to circulate through the vats by means of a force pump, C. The liquor in the vats is subjected to pressure regulated by a weighted valve, and the hides are forced through the liquor by being placed on vibrating frames, H, Fig. 2, within the vats.

The water is mixed with the bark in the reservoirs, E″ E‴ E⁗ E⁗′, and these reservoirs have perforated false bottoms through which the clear liquor is strained into the lower parts of the reservoirs. From these places it is drawn out by means of the pump through branches from the pipe, A, which pass through the ends of the reservoirs, and are bent down so as to extend through the false bottoms into the clear liquor below. These branch pipes are provided with stop cocks, so that the connection between any one of them and the pump, may be opened or cut off at will, and thus the liquor may be drawn from such of the reservoirs as the operator may desire.

From the pump the liquor is forced into the vats through the pipe, D, which has two branches leading into the bottoms of the vats, X and X″. From the top of vat X, a pipe, D″, leads to the bottom of vat X″, and a pipe, F, leads to the bottom of vat X‴. The pipe, D‴ leads from the top of vat X″ to the bottom of vat X⁗, and the pipe, F′, leads from the top of vat X‴ to the bottom of vat X⁗′. A pipe, D⁗′, leads from the top of vat X⁗ to the pipe, F⁗, which is connected with the top of vat X⁗′. All of these pipes are furnished with stop cocks, so that any vat may be thrown out of the circulation by simply opening and closing the proper cocks.

From the upper end of pipe F⁗, a pipe, D⁗′, leads down to the reservoirs with all of which it is connected by branch pipes ; each branch being furnished with a stop cock.

It will thus be seen that the tanning liquor is kept in constant circulation through the vats containing the hides, and through the reservoirs containing the bark ; extracting in its course the tannin from the bark and carrying it to the hides. The liquor in its circuit may be passed through such of the vats and reservoirs as the operator may desire by simply turning stop cocks.

In the upper end of the pipe, F⁗, but below the exit of pipe D⁗′, is a valve which is pressed down by a weight upon the lever, N. By setting this weight at the proper point upon the lever, the pressure of the liquor within the vats may be adjusted to any degree desired. An emptying pipe, G, connected with the bottoms of all the vats by branch pipes, leads into the reservoirs, E.

The frames, H, Fig. 2, in the vats are hung upon shafts which pass through stuffing boxes in the ends of the vats, and they receive a vibratory motion from

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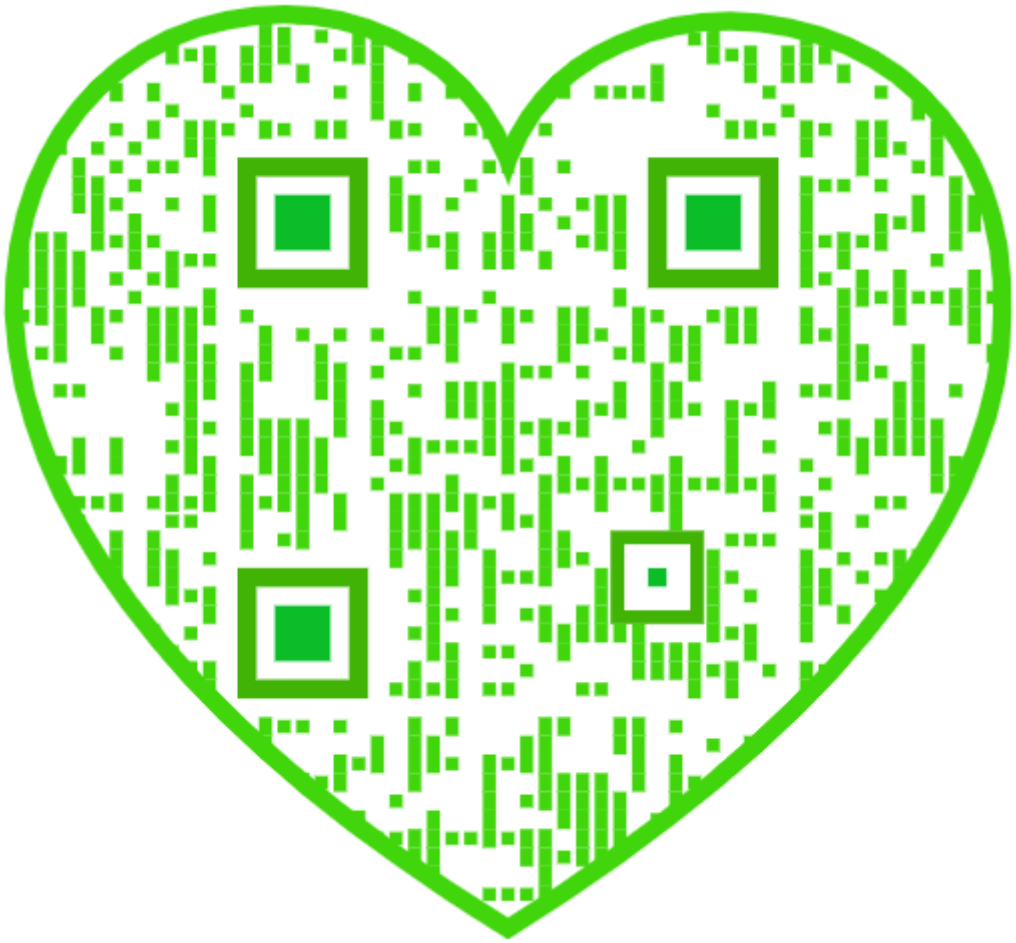


eccentrics on the pump shaft with which they are connected by levers in such manner that by simply lifting the levers out of connection, the action of the frame in any vat may be suspended. The hides are introduced into the vats through manholes provided for the purpose.

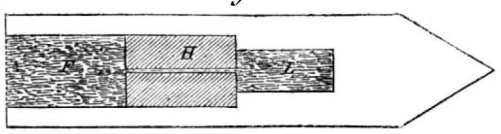
The patent for this invention was granted Nov. 6, 1860, through the Scientific American Patent agency, and further information in relation to it may be obtained by addressing the inventor as above.

Projectiles for Rifled Cannons.

[Concluded from last week.]

In the second method proposed for the improvement of projectiles, in order to insure more effectually an increase of action of the new auxiliary impulses to be applied to the projectile during its flight, I propose to use the explosive force of gunpowder to drive it along in its course. For this purpose the chambers or barrel on the rear of the projectile may be formed and loaded, as shown in Fig. 2, wherein L is a charge of gunpowder, H a heavy cylindrical shot or plug, with touch-hole and priming therein, and F a common fuze, or the rocket composition as above suggested.

Fig. 2

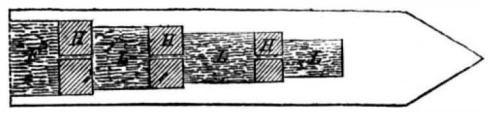


With reference to this proposed arrangement it will be understood that after the shot or shell, thus prepared, has been discharged from the gun, the fuze or composition powder, F, will thereby be ignited, and during the flight burn down to the priming in the plug, H, and thus explode the charge, D. The size of the fuze, or quantity of composition, must of course be timed and regulated so as to cause said explosion to take place at the most advantageous point in the range thereof. It may require probably, in the first instance, some little skill and practice in preparing and loading this projectile, in order to avoid every possibility of danger of its exploding within the bore of the gun. The cylindrical plug, therefore, should rest and abut on the shoulder of the chamber, L, and fit the barrel, F, as close as practicable and if necessary, may be packed and luted so as to be perfectly air-tight. The fuze, F, to the same end, may be rammed and packed directly into the barrel of the projectile and thus avoid the porosity of the fuze cord.

The action or reaction of the explosive force of the charge, L, as here proposed, must evidently give a powerful impulse to the projectile, which is at the time, moving with a very rapid velocity. To appreciate the amount of this reaction, it will be understood that at the time of said explosion the plug, H, is moving with the same velocity and direction as the projectile itself, and hence must have a momentum equivalent to its weight and velocity. The explosive force of the charge, L, therefore, to drive said plug out from the barrel of the projectile, must resist and in a measure overcome this said momentum. For example, if the force of the charge, L, was sufficient to give a velocity to the plug (when fired from a state of rest) equal to the velocity of the projectile at the time of the proposed action, it is evident the two forces or velocities would counteract each other, and the plug would fall out of the end of the barrel, as it were, perfectly dead or void of all motion, the gyratory motion of the projectile alone excepted.—Hence, as action and reaction are always equal, the reaction of the explosive force, in this case, to accelerate the velocity of the projectile and drive it forward, would be nearly equivalent to the effect of said explosion acting on and against a solid and stationary body. This reaction on the projectile being in proportion to the momentum of the plug, we may make the plug as large as practicable, to fit the bore of the barrel, so as to obtain the greatest velocity possible. When the projectile is arranged to carry a shell, carcass or the like for bombardment, the loss of weight therefrom by the abstraction of the plug, &c., from the body of the projectile would not be objectionable.

The above illustrates the mode proposed whereby one single explosive impulse may be given to the projectile during its flight, to increase its velocity and range. It is believed practicable, however, by increasing probably the length of the projectile and making the size and power of the rifled guns suitable thereto, to multiply the number of auxiliary impulses to the projectile, at pleasure. Thus in Fig. 3 is shown an arrangement whereby three successive impulses may be given to the projectile during its flight. H H H represents the several plugs, L L L

Fig. 3



the charges or gunpowder, and F the fuze or composition, as before mentioned. In this arrangement the primings may be the fuze or composition powder, which burns slower than gunpowder, so that the explosion of the several charges, L L L, may not be instantaneous, but in succession at certain intervals to be regulated by the quantity and quality of the priming. When a power is constantly acting on a body in motion, as gravitation for instance, the velocity of the body becomes uniformly accelerated. In the case of the projectile before us, after the same should be projected from the gun, the power proposed to act thereon, would not of course be a constant power, but one acting at certain very small intervals of time, the effect therefore would be analogous, and each new impulse would tend to increase and accelerate the previous velocity of the projectile.

How far it would be practicable to project a shot or shell with this proposed arrangement, may probably be calculated by some of the known formula in gunnery; its solution, however, would be most satisfactory by a few practical experiments. The projection of shot or shell beyond the limits of vision may at first appear of doubtful utility; we believe, however, that when the same is regulated and directed by the rigid rules of topography and trigonometry, there would be many cases where the same would be found highly useful and efficient. The improvement, however, it will be readily understood, which has the power to project the shot or shell to the greatest possible distance, must necessarily have power to strike nearer objects with the greatest possible force. The rapid introduction of steel-clad armor to vessels of war, and the impunity with which they can face and defy the most powerful ordnance of the present day would seem to demand some improvement in the force of projectiles in order to oppose and resist them. In all new inventions, should imperfections exist, practice will generally point out the defect and supply the remedy.

The barrels or chambers in the projectiles above proposed, as we have already stated, should be made concentric with the axis thereof. The recoil of a gun being known to be always in the line of the axis of the bore thereof, the proposed explosions in the projectile cannot therefore deflect the same from its intended course or aim. In addition thereto the rapid gyratory motion of the projectile, or its *vis viva*, tends also to counterpoise the inequalities in the density of the projectile and the component parts as herein suggested, and also to resist the inequalities, should they exist, in the explosive action of the charges therein.

Charles Potts, C. E.

Trenton, N. J., Dec. 2, 1861.

Naphtha and Benzole in Paints and Varnish.

Messrs. Editors:—I have been trying to use, for some time past, in paints, &c., refined naphtha, refined benzole or benzini instead of spirits of turpentine. I have had no trouble in using it in mixing paints, but cannot use it in asphaltum varnish. I have tried to thin black varnish made of asphaltum, spirits of turpentine and a small quantity of linseed oil boiled, but it would not mix—it curdled. I tried to make the same varnish by using the refined naphtha instead of spirits of turpentine and naphtha, but had the same trouble in both instances. I tried, also, to use it in copal varnishes. I melted the gum as usual, and reduced it as hot as I could, in one instance, with part spirits of turpentine and part naphtha, and in another instance with naphtha alone, and it seemed to work well enough. I had no trouble in straining it, but the next morning when I looked at it I found that the gum was precipitated to the bottom. I have tried to use the naphtha in place of spirits of turpentine in a drier for paints in which gum copal was used, and have had no trouble whatever. Now, I am at a loss to account for these things. I wish to inquire, through the columns of your excellent paper, how refined naphtha can be used in copal and asphaltum varnishes. I have asked a good many painters, &c., but I have not been able to ascertain, and I found that they were as anxious to learn as I was to find out in regard to it. Perhaps some of your subscribers who have been more successful in using it, and some parties who are interested in the manufacture or sale of the naphtha would inform your subscriber of the manner in which it is used. E. A. W. Jones.

Boston, Dec. 4, 1861.

[The above letter tells its own story. Our correspondent has not succeeded in rendering naphtha or benzole permanent solvents of asphaltum and gum copal. Perhaps some of our correspondents may be able to give the information desired. The fact of turpentine being scarce and costly accounts for the efforts made to obtain a substitute such as naphtha in making varnishes.—Eds.

The Inventive Genius of the Country.

It is no less remarkable than flattering to the American people that, whenever any event occurs, or any enterprise is undertaken, in which scientific improvements might be of value, numbers of inventors come forward with specifications offering everything required for the accomplishment of the desired purpose. Thus, when the Atlantic cable was talked of, numerous suggestions were made for the laying of it, and when it broke hundreds published plans, through the newspapers, for remedying the disaster, all of which were represented to be certain of success if afforded the opportunity of a trial. In like manner, a boiler explosion cannot take place in the city or on the river without scientific remedies being proposed against the recurrence of such accidents, nor a collision at sea without new inventions or improvements in steering gear, lights and other appliances. It is the same with the present war; and we publish in another column a list of patents which have been taken out since its commencement for new inventions or improvements in implements of war and other army requisites. The list includes projectiles, rifle and smooth bore cannon and small arms, breech-loading firearms, balloons, tents, canteens, camp furniture, military clothing, horse accouterments, hospital fittings, surgical instruments and other miscellaneous matters. It is obvious that the genius of the country is always equal to an emergency; and it augurs well for our future that we have such a wealth of inventive talent to assist in developing the immense resources at our command, and to add to our national strength and greatness. We may soon lay to ourselves the flattering unction that we are behind none in the mechanical arts, and in advance of many.

[The above is from the New York *Herald*. All the claims of the military inventions to which it refers, have been published in our columns weekly, as issued, and as stated by us in another article, a large number of them have been illustrated and fully described in the Scientific American. No less than 170 patents for army and navy implements have been granted. Of these 54 have been for improvements on cannon and small arms; 22 for projectiles; 32 for camp furniture; 10 for tents; 6 for canteens; 2 for war balloons; and 44 for miscellaneous articles. These afford evidence of the intense interest of our inventors in the war, and the intellectual acumen which they have brought to bear in furnishing our army with the best and most perfect articles for rendering our army and navy superior in equipments to those of all other Powers.

Population of the British Provinces in North America.

From the Montreal *Journal of Education* we take the following statistics of the population of Canada and other British provinces as shown by the latest census returns. The *Journal* states that the returns from the county of Saguenay in Canada East are not included, as they were not received at the time of publication. The pupulation of this county is estimated at between 3,000 and 4,000.

Canada West (census of 1861)	1,395,222	
Canada East (census of 1861)	1,103,666	
		2,498,888
New Brunswick (census of 1860)		250,000
Nova Scotia (census of 1861)		330,857
Newfoundland (census of 1857)		122,638
Total		3,202,383

The whole of these Provinces do not contain a population equal to the State of New York, and yet Nova Scotia was settled as early by Europeans.

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THE GEOLOGICAL HISTORY OF NORTH AMERICA.

BY DR. STEVENS.

Sixth Lecture.

At the era treated of in our last lecture, the lizards and other reptiles were the most abundant of any class of animals, and they were the highest type of animals upon the earth. Next after them were created those animals which suckle their young. These are called mammals from the Latin word, *mamma*, breast.

The characteristic feature of the mammalian era was the introduction of many species of large animals now extinct, some of them allied to existing genera, but most of them having no living analogues.

Animals now only found within the tropics—as the elephant, rhinoceros, and tapir—had their feeding grounds as far north as Canada. While the Mastodon roamed still farther north, and his limits reached from the Rocky Mountains to New England and Long Island. In the rivers of Nebraska, swam the hippopotamus, now only found in the waters of the warm regions of Africa. Several species of rhinoceros wallowed in the cane brakes of the same State.

In Virginia and Kentucky, the mammoth sloth, *Megalodon Jeffersoni*, browsed on the forests of poplar, willow and trees of other genera that have come down to our day. Animals of the camel order trod the sandy deserts, the hog wallowed in his mire, the horse skimmed over the plains, the ox fed on the broad prairies and ruminated in the shade of forests growing by the water courses.

About the middle of this era, carniverous animals were introduced, to feed upon the increasing multitudes of the ruminants, thus fulfilling the great law of the animal kingdom, that the enormous power of reproduction given to lower animals should not increase so vastly as to fill the earth to the exclusion of others, but that the Malthusian fear of the danger of overpowering reproduction, should be removed by an order of animals destined by habit, dentition, physiology and design, to feed upon their fellow animals, and keep within limits the number of individuals.

A very significant feature of the close of this era, is the increase of animals allied to our domestic and mals, milk and flesh-producing—with burden-bearing —while at the same time there was an increase of fruit bearing trees, bread-producing cereals and grasses clothing the plains, not necessary for the old type, and prophetic of a higher type in the succeeding age.

In the latter part of this era appear the monkey tribes—men of the woods—earlier upon the European, later upon the American continent. According to the development school, these are the progenitors of the human race, but according to a more rational school, and to which geology lends all its testimony, they are the ante-type of man; just as the closing years of each preceding age gave promise of newer and higher types in the eras following.

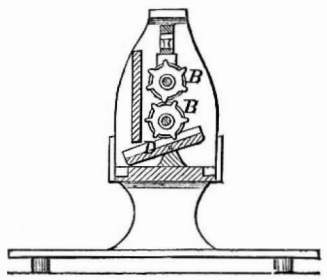
Our continent received additions in this age along its sea-board line from Lubec, in Maine, to Florida, the Gulf slopes of the Gulf States, the valley of the Hudson, Lakes George and Champlain, and the St. Lawrence received deposits. We think also that the blue and yellow clays of the lake region belong to the same age. A large inland body of fresh water filled the eastern part of Nebraska, and with many interruptions, this or similar bodies extended by the Red river of the north, west of Lake Winnipeg, perhaps up to the Arctic continent. Greenland also had additions to its sea-board line. Disco Island and the main land have coal or lignite of this age. The desert of Utah, and south of it, along the Colorado, and large patches in California were covered by waters of the Gulf of California and the Pacific Ocean.

We have no valuable minerals added to our mining treasures in this age, but what is quite equivalent to it, the gold of the Pacific slope of the continent was washed from the mother veins and deposited in placers for the miners of the present time.

THE export trade of Great Britain and Ireland has suffered a great reduction this year. For the last nine months, commencing January 1st, ending October 1st, it amounted in value to £93,795,332, against £101,724,346 in 1861. The entire falling off for the year will amount to about $53,000,000.

WRINGING MACHINE---WASHING MACHINES FOR THE ARMY.

A correspondent writing to us from Philadelphia, says "we have army stores, army chests, why not army washing machines?" Yes, why not? This is a good suggestion, and as an accompaniment to washing machines why not army wringing machines? Clothes out of which the water is very thoroughly pressed, will dry in one-fourth the time of clothes which are imperfectly wrung. Dispatch in wringing and drying clothes is very desirable, and the accompanying figure represents a combined wringing machine for extracting the water from washed clothes. B B are two rollers covered with india rubber, and meshing with teeth into one another. Below them is an oscil-



lating guide board, D. This machine can also be used for washing clothes as well as wringing them, as the roller will rub the clothes upon the oscillating board, D, while it squeezes out the water. The journal of the upper roller is graduated by a screw box to exercise any degree of pressure necessary. The course of the water is directed by the board, D, to pass into the tub at the one side. By passing the clothes between the rollers, the water is pressed out of them in proportion to the pressure on the journals.

Patented by S. A. Bailey, March 17, 1860.

HARDENING AND TEMPERING TOOLS AND METALS.

Number VI.

Watch springs are both hammered and rolled out of steel wire until they are reduced to fit a gage which determines their equality in thickness. After being trimmed on the edge and punched at the end they are tied up in a loose open coil with a binding wire and placed upon a revolving iron plate which is situated over a charcoal fire. When they attain to a dull red color they are lifted off and plunged into a cold oil bath, which hardens them; they are then run through the fire and the oil "blazed off," which operation tempers them. Each spring is now distended upon a long metal frame, like that of a saw blade, and polished with emery and oil placed between two blocks of lead. This polishing operation completely destroys the elasticity of the spring, when it may be bent like a piece of iron, but the elasticity is again restored by hammering it upon a polished anvil. After this the springs are colored blue by placing them upon a flat plate of iron covered with a hood which is heated by a spirit lamp placed under it. The spring is continually drawn backward and forward, a few inches at once, in this small oven, until it assumes the deep blue color desired. The coloring of these springs is not really essential, but most people have a different opinion. Each spring, after being colored, is coiled into spiral form with a small tool which winds it upon an axis.

The hair springs for the balance wheels of watches are frequently left very soft, but the best are hardened and tempered in the coil placed round a small cylinder. After this they are curled spirally between the blunt edge of a knife and the thumb of the operative, in the same manner that a strip of paper and the filament of an ostrich feather are frequently curled. The art of manipulating balance springs requires great practice, and a fine touch of the hand. These delicate articles are really triumphs of mechanical skill, as it takes about three thousand of them to weigh one ounce.

Bow springs for carriages and railway trucks are hardened by first heating them in a clear hollow fire on a hearth until they are red hot, then they are dipped in water. After this the temper is given by heating them until a piece of wood drawn across the surface emits a sparkle, when they are removed and cooled in the air. An oven heated to 600° may be used as a superior substitute for tempering in the open fire.

Much diversity of opinion exists respecting the cause of elasticity or spring in steel and some other metals. The thin blue skin upon the surface of a steel spring is supposed to be the principal part which sustains the elasticity, as when this is rubbed off the elasticity is always impaired. But swords are polished as bright as mirrors and some of them are so elastic that they may be wound upon a cylinder and will spring back to their original set. It is not the blue skin then which contains the essence of the elasticity in springs.

The principles and practice in hardening and tempering steel consist in first heating the metal or tool until it becomes red hot, then plunging it into a cold solution, which hardens it. It is now tempered (rendered softer and made elastic) by reheating it, but not up to the previous heat which was used before hardening. Cold water, salt brine and various preparations of oils and grease are used for hardening baths. Almost every cutler and blacksmith has some little hidden secret which he thinks is better than that of every other person. We apprehend that many nonsensical ideas prevail among mechanics and other on the subject. We have records of several experiments in tempering steel, but there exists a necessity for a new set to be undertaken, and we hope some judicious mechanic will undertake them, and furnish the public with the results through our columns.

CHEMISTRY OF IRON.

Number IX. and Last.

CHEMICAL NOMENCLATURE.

No other science has so perfect and simple a nomenclature as chemistry. When any elements enter into combination, this combination is expressed in the name. A substance formed by the combination of oxygen with iron is called the oxide of iron, and one formed by the combination of sulphur and iron is called the sulphide of iron; the name of the metal, when one is a metal, being placed last, and the non-metallic element taking the termination *ide*; thus we have phosphides, bromides, iodides, &c.

Oxygen in combining with other elements in many cases forms acids, and when this is the case the substance is simply called an acid with the termination *ic*, as sulphuric acid, nitric acid, phosphoric acid, &c. If oxygen combines with an element in two proportions forming two acids, the one having the least oxygen takes the termination, *ous*, as nitrous acid, sulphurous acid, &c.

When an acid combines with a base to form a salt the compound is expressed by the termination *ate*. Thus carbonic acid and soda form the carbonate of soda. But if the acid ends in *ous* the salt takes the termination *ite*. Sulphuric acid and lime form the sulphate of lime, while sulphurous acid and lime form the sulphite of lime.

When elements combine in several proportions these are distinguished from each other by a few Greek and Latin prefixes: *protos*, first; *per*, through or to the end; *hypo*, less; *sub*, under; *bi* or *deu*, two; *tri*, three; and *sesqui*, one and a half.

This may be illustrated in the combination of the two gases that form atmospheric air. Oxygen combines with nitrogen in five different proportions; in the proportions respectively of one atom of nitrogen to one, two, three, four, and five atoms of oxygen; expressed in symbols

$$N\,O$$
$$N\,O_2$$
$$N\,O_3$$
$$N\,O_4$$
$$N\,O_5$$

Two of these compounds, $N\,O_3$ and $N\,O_5$, have acid properties, hence the $N\,O_5$ is called nitric acid and $N\,O_3$ nitrous acid; leaving us three substances to be called oxides. From the principles laid down we shall have no difficulty in naming them. N O is the protoxide of nitrogen, $N\,O_2$ the deutoxide (the t being introduced for euphony) and $N\,O_4$ the peroxide.

TWELVE miles south of Chicago, the Illinois Central Railroad Company are engaged in building a continuation of corn cribs, said to be eleven miles in length, along the line of the road, with a total capacity exceeding 3,000,000 bushels.

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NOTES ON MILITARY AND NAVAL AFFAIRS.

THE FIGHT AT FORT PICKENS.

Since our last we have an official account of the fight at Fort Pickens. It seems that Colonel Brown, the commander, attacked the forces of General Bragg, to punish them for their attack on him, and also for the purpose of stopping the operations at the Navy Yard. A noisy bombardment was kept up for two days, the 22d and 23d of October, between Fort Pickens and the beleaguring fortifications which surround it in a semicircle for an extent of some four miles. The Navy Yard was partially burned, and nearly all the guns in the rebel batteries were silenced. Two of our naval vessels, the *Niagara* and the *Richmond*, took part in the attack, and the former threw her 11-inch shell among the batteries with great effect. On the first day nearly all of the crew of the *Niagara* crowded on deck to witness the action; but on the second day the watches off duty were ordered below, where some of the men went quietly to sleep in the midst of the tremendous noise, while others amused themselves in playing backgammon.

EXPEDITION TO NEW ORLEANS.

The steamship *Constitution*, which left Boston Nov. 21st, with the 26th Massachusetts, and the Ninth Connecticut regiments, composing a part of General Butler's division arrived at Fortress Monroe on Saturday, Dec. 14th. The troops were landed on Ship Island, Mississippi, on the 4th inst., by some rebel steamers captured by our fleet.

Ship Island is off the coast of Mississippi, on the line of approach to New Orleans, not by the way of the mouth of the Mississippi, but by the way of Lake Borgne at the East. It is between New Orleans and Mobile, about equi-distant from the two cities.

MUSTERING IN KENTUCKY.

The hostile forces are accumulating in large numbers in Kentucky, and great events are anticipated there soon. Some anxiety has been felt for the command of Gen. Schoepf, which is near Sommerset in the South east part of the central portion of the state. At last accounts, however, he was fortifying himself and it was thought that his command was safe.

WAR WITH ENGLAND.

All other events are just now lost sight of in the grave danger of a war with England. By the arrival of the *Europa*, at Halifax we have news of the reception in England of intelligence of the capture of Mason and Slidell, the rebel emissaries, by Captain Wilkes. The wildest excitement prevailed throughout England, and nearly all of the papers were calling upon the government to demand reparation for what they hastily conclude is an insult to the British flag. The case had been submitted to the Law Officers of the Crown, and the London *Times* says :—

It is, we understand, the opinion of these jurists that the right of the Federal government, acting by its officers, was *confined to the visiting and the searching of the mail packet*; that if any men or things believed to be contraband of war had been found on board of her, the proper course was to *take her into port and submit the question to the Prize Court*, which would hear evidence and argument on both sides, and would have decided the case according to precedent and authorities.

The *Post*, a paper that has always been peculiarly hostile to this country, expresses the opinion that the British government will demand the surrender of Mason and Slidell, with very humble apologies for the insult. Great preparations are being made in England for war, the exportation of Saltpeter and sulphur is prohibited, and arms and soldiers are being sent in large numbers to Canada. In the midst of the excitement, Mr. Bright, the democratic member of parliament for Manchester, had raised his voice in favor of peace, and his friend Cobden of the same party had requested a suspension of opinion until the facts and the law were better understood.

The total number of arms bought in Europe since the beginning of the war is about 200,000. Many of them are poor in quality, and all quite inferior to American made guns. A proper encouragement of American gun makers by making all future purchases of them, will unquestionably become the policy of our government.

The most valuable portion of the city of Charleston, S. C., was destroyed by fire on the 11th and 12th inst. The account which comes from Southern papers is confirmed by the commander of the *Illinois* who passed within ten miles of Charleston on the evening of the 12th, and saw that a vast conflagration was raging in the city.

The "Prince Alfred" Gun.

The Liverpool *Albion* says :—Last week we noticed the result of some experimental trials with this gun, which were illustrative of several points at present under discussion with regard to the efficacy of different kinds of ordnance when applied as assailant to the gigantic floating batteries recently introduced into the naval service of this country, and also of France. The experiments noted last week showed that a spherical solid shot, 140 lbs. weight, propelled by 20 lbs. of powder, against a target placed at 210 yards distance, composed of teak 18 inches thick, and covered with wrought iron plate 4½ inches, neither perforated nor broke the target although the plate was deeply indented, and the whole target was driven completely out of its place and overturned, notwithstanding all the precautions used to prevent its removal. Previous experiments made under the immediate direction of the government had shown that the most formidable ordnance which has hitherto been brought against the iron-plated frigates was the old smooth-bore 68 pounders, weighing 95 cwt., the ball propelled by 20 lbs. of powder; or, at all events, that these produced a more powerful effect against iron cased targets or ships than any of the more modern rifled cannon with which they have been tested. Calculating from the effects produced by the guns mentioned, a supposition gained credence that, by increasing the caliber of the gun and the weight of the projectile, a correspondingly increased effect would be produced. To test this theory, in some measure, was one of the objects sought to be achieved in the experiments with the *Prince Alfred* gun. The superiority of the smooth bore over the rifled cannon was believed to arise from the higher initiatory velocity of the shot from the former over the latter, the difference being as 2,000 feet per second for the smooth bore to 1,200 feet per second for the rifle; and reasoning *à priori* this appeared to favor the opinion as to the increased effect from the increased weight of the shot. The *Prince Alfred* being as yet of a smooth bore, of 10 inches in diameter, and carrying a spherical shot of 136 lbs., or exactly double that of the 68 pounder, the opportunity of testing the theory was a tempting one, and further experiments were tried with it on the beach between Crosby and Hightown in course of last week. The same target was used as in the previously recorded experiments. It was again fastened with the greatest care to ensure its offering the utmost possible resistance; a resistance, indeed, completely equal to that presented by the side of the *Warrior* or *Black Prince*, and placed at the same distance from the gun as on the former occasion. In this instance the ball was propelled by 30 lbs. of powder, or three-forths of the full proportionate quantity used in the case of the 68-pounder. The result was that the plate, which was struck near the center of the target, was partially broken; the indentation being upward of 6 inches, while the teak at its back was splintered but not penetrated. The shot, as has invariably been the case in such experiments, was broken into fragments. This concluded the experiments, as, from its shattered condition, the target could not have resisted the effect of another shot.

The plate which had sustained so crushing an ordeal was made at the Mersey Steel and Iron Works, and was of similar quality to those which covered and protected Jones's angular target, which stood so well in the experiments made at Portsmouth. The resisting power of this plate excited the admiration of several officers who were present at the experiments with the *Prince Alfred*, as, although the indentation was more than six inches deep, it was not entirely fractured. It was also incidentally suggested, as worthy of consideration, how far it might not be desirable to increase the charge of the powder to 40 lbs., which would be in the same proportion as the charges generally used with the 68 pounder.

It was incidentally mentioned on the ground that the gun will soon be removed to the Mersey Iron Works for the purpose of being rifled, and so fitted to carry elongated shot of 500 lbs., when it is expected the experiments will be resumed. If, however, as experience has hitherto shown, the smooth bore has so decided an advantage, from the greatly superior initial velocity of the shot, the expectations fairly arising as to the effect of so enormous a shot may not be fully realized. Be this as it may, however, the experiments referred to are of the greatest importance, although hitherto carried on on a comparatively small scale, as they tend to prove that a 4½-inch plate, when well made, is sufficient to resist a shot double the size and weight of a 68 pounder, which has hitherto proved its most dangerous antagonist. Founded on the theory which has been previously alluded to as to the effect of the increased size and weight of shot, it has been asserted that our floating batteries might be easily destroyed by merely increasing the size of the ordnance brought against them; and that, consequently, our French neighbors might reap little advantage from their start in having cased their frigates. Experiments, however, show that a limit to the cohesion of cast-iron shot has been reached; and almost practically demonstrate that plates 5½ inches, or, as now proposed, 6½ inches thick, if properly made, will be completely impenetrable, whatever the size of the ordnance brought to bear against them may be.

The Eye and Vision.

Although we derive so much pleasure and obtain so much knowledge through the sense of vision, very few persons are really acquainted with the powers and peculiarities of the eye. Thus our range of vision is bounded by the objecting parts of the face. In relation to this Dr. Alfred Smee says :—"If the eye be steadily directed toward one point, it is sensible of the presence of objects over a vertical range about 121° and a lateral range of about 149°." But perfect vision is only obtained over a range of about 2° 18′ which in practice is in the relation to the distance of the object to be viewed as 1 to 25. Thus at 25 inches distant, a person will be enabled to read a word one inch long without the slightest motion of the eye, and at twelve inches distant a word half an inch long may be read in the same way. Where the optic nerve penetrates the eye, the retina is insensible to light, which causes a total loss of vision over about 6° 20′ —the commencement of the insensible spot being 12° from the center of vision. As the result of this there is a portion of the field of view, equal to one-eighth the distance of the object, which is utterly lost: and though it seems at first thought incredible, it is nevertheless true, that in regarding a range of hills eight miles distant, one mile of the range is not perceived by the eye.

THE IMPORTANCE OF CURRYING ANIMALS.—It is well known that every hair, whether long or short, is covered with numerous little barbs, like the barbs of fishhooks, and, therefore, when a number of hairs are brought in contact with each other, and moved back and forth, they will work in among each other, and often form a mass so tangled—like the mane of a colt, which our ancestors, have often taught us to believe were the stirrups of witches, which were accustomed to ride them in the dark nights—that it is difficult to disentangle them. The only means that cattle have of scratching themselves many times is to apply their tongues; and when the hair comes off, as it many time does, by the handful, more or less of it will adhere to their tongues, and many times find its way into their stomachs; and the reciprocating motion of the stomachs of animals which chew the cud would soon form a bunch of hair into a pellet; and, as more hair was taken into the stomach from day to day, it would be very sure to all collect in one mass. Now, when an animal begins to shed its coat of hair there always appears to be more or less irritation of the skin, and if the card or curry-comb is not used pretty freely the tongue must be applied; and if an animal is well curried every day, when it is shedding its coat, it will be far less liable to collect hair in its stomach. A ball of hair—being indigestible—in the stomach would be very likely to injure its energies so as to produce disease, and enventually, premature death.

A SEVERE JOKE.—Immediately after the capture of Hatteras, Senator Simmons, of Rhode Island, fitted out a schooner, called the *Charity*, with an assorted cargo, including a large quantity of whisky, and sent her down the coast on a trading venture. She took a Collector to Hatteras, and on arriving there the Collector procured a building from the commissary, which he proposed using as a custom house. Capt. White's papers, however, were very irregular, and on the 17th inst. Capt. Worden, of the *Stars and Stripes*, seized the *Charity* as a prize, and sent her to New York. The Collector, captain and crew of the *Charity* arrived here in the *Spaulding* on the 19th. They are very indignant at their treatment.

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NOTES ON SHIPBUILDING AND THE CONSTRUCTION OF MACHINERY IN NEW YORK AND VICINITY.

THE STEAMER PO YANG.

Hull built by Messrs. Rosevelt, Joyce & Co., New York; the machinery was constructed by the Allaire Iron Works, New York; owners, Messrs. Olyphant & Sons, New York; intended service, coast of China.

Hull.—Length on deck, 220 feet; breadth of beam, molded, 30 feet; depth of hold to spardeck, 11 feet 6 inches; floors, molded, 14 inches; sided, 6 inches, and the frames are 18 to 28 inches apart at centers; draft of water at load line, 7 feet; tunnage, 956 tuns.

Engines.—Vertical beam; number and diameter of cylinder, one of 50 inches; length of stroke of piston, 12 feet.

Boilers.—Two, return tubular, located in hold; they are constructed of the best material, and are of the most durable character.

Water Wheels.—Diameter over 'boards, 28 feet; material iron.

This vessel was constructed with extraordinary strength, her material being live oak, chestnut, &c. She is fastened with copper and treenails, and around her frames, iron straps, diagonal and double laid, $3\frac{1}{4}$ by $\frac{5}{8}$ inches are placed, making them very secure. Her rig is that of a fore topsail schooner; her bunkers are of wood, and she has an inclosed forecastle, but no sponsors under water wheel guards; she has two water-tight bulkheads, an independent steam fire and bilge, and the ordinary bilge injections. The whole construction of the *Po-Yang* is highly creditable to the skill of Messrs. Rosevelt, Joyce & Co., and gives great satisfaction to her owners.

THE STEAMER CONTINENTAL.

Hull built by Messrs. J. Sneden & Co., Greenpoint; the machinery was constructed by the Morgan Iron Works, New York; Owners, New York and New Haven Steamboat Company; intended service, New York to New Haven.

Hull.—Length on decks, 282 feet 6 inches; breadth of beam, molded, 35 feet 8 inches; depth of hold, 11 feet 5 inches; floors, molded, 6 inches, sided, 12 inches, and her frames are 24 inches apart at centers; draft of water at load line, 6 feet 6 inches; tunnage 1,130 tuns.

Engines.—Vertical beam, number and diameter of cylinders, one of 70 inches; length of stroke of piston, 11 feet.

Boilers.—Two, tubular, located on guards, and have one blower to each.

Water Wheels.—Diameter over boards, 34 feet; number of blades, 32; material, wood.

THE STEAMER CONSTITUTION.

Hull built by Mr. William H. Webb, New York; the machinery was constructed by the Novelty Iron Works, New York; owners, Pacific Mail Steamship Company; Superintendent of construction, Captain Francis Skiddy; commander, A. T. Fletcher; intended service, San Francisco to Panama.

Hull.—Length on deck, 333 feet; length over all, 364 feet 6 inches; breadth of beam, molded, 44 feet; depth hold, 23 feet 6 inches; depth of hold to spar deck, 31 feet 6 inches; floors, molded, 15 inches; sided, 18 inches; and the frames are 36 inches apart at centres. These frames are fitted in solid, and have iron straps, diagonal and double laid, $4\frac{1}{2}$ by $\frac{7}{8}$ inches, running around them, securing them in the best possible manner; draft of water at load line, 20 feet; Rig, brig; tunnage, 3,446 tuns.

Engines.—Vertical beam, number and diameter of cylinders, one of 105 inches; length of stroke of piston, 12 feet.

Boilers.—Four, return flue; length 32 feet 4 inches; breadth, 13 feet 3 inches; hight, 14 feet. There are, in addition to these, four single return boilers, each being 3 feet 4 inches in breadth.

Water Wheels.—Diameter over board, 40 feet; material, Iron.

This vessel is built of live oak, chestnut, hacmetac, &c. She embraces all the modern improvements for securing great strength, safety and comfort. She was intended for the service, as mentioned above, but owing to her great capacity, and her moderate draft of water when loaded, she was looked upon as a desirable steamer for transport service, and chartered by the national government. An interesting and detailed description of her performances during her late trip from New York to Boston, will be found on page 365, of the present volume of the SCIENTIFIC AMERICAN.

THE STEAMER STARS AND STRIPES.

Hull built by Mr. C. Mallory, Mystic, Conn.; the machinery was constructed by Mr. C. H. Delamater, New York; owners, New Haven Propeller Company; intended service, New York to New Haven.

Hull.—Length on deck, 150 feet 6 inches; breadth of beam, molded, 34 feet 6 inches; depth of hold, 8 feet; frames are securely fastened and strapped with iron braces diagonal and double laid; draft of water at load line, 9 feet; rig, three-masted schooner; tunnage, 410 tuns.

Engines.—Vertical direct, number and diameter of cylinders, 2 of 26 inches; length of stroke of piston, 2 feet 6 inches.

Boiler.—One, return tubular, located in hold, and uses a blower.

Propeller.—Diameter, 9 feet; material, cast iron.

This vessel is constructed of white oak, chestnut, &c., and put together in a masterly manner. She was intended for the service as above mentioned, but upon her completion, she was purchased by the national government, and is now doing excellent blockading duty upon the southern coast.

THE GUN BOATS UNADILLA, SENECA, OTTAWA, PEMBINA CHIPPEWA, AND WINONA.

Hulls constructed by Mr. John Englis, New York; Mr. Jeremiah Simonson, Greenpoint, L. I.; Messrs. Jacob Westervelt & Sons, New York; Mr. Thomas Stack, Williamsburgh, L. I.; Messrs. Webb & Bell, Greenpoint, L. I.; and Messrs Poillon & Co., New York; the machinery was constructed by the Novelty Iron Works, Morgan Iron Works, and Allaire Iron Works, New York; owners, United States government.

Hulls.—Length of the load line from fore side of the rabbet of the stem to the aft side of the forward sternpost, 158 feet; breadth of beam, extreme, 28 feet; depth of hold, from inside of floor timbers to under side of deck plank, amidships, 12 feet; frames of young white oak of the best quality; floor, and first futtocks, sided, 8 to 10 inches; the remaining futtocks are sided, 7 to $7\frac{1}{2}$ inches; and the top timbers and stanchions, side $6\frac{1}{2}$ inches; throat of floors amidships, 12 inches: molding size at the turn of bilge, $9\frac{1}{2}$ inches, and at the plank sheer, $5\frac{1}{4}$ inches; the timbers of the frames are close together, and each scarf is bolted with three iron bolts, $\frac{3}{4}$ inch in diameter, and care was taken that the bolts were clear of the lodge knee and waterway bolts; the stanchions forming the sides of the ports are of locust and live oak, being sided one inch more than the other stanchions, and between the ports the stanchion of every other frame runs up to the rail; keel of white oak of the best quality, sided, 13 inches, depth, 10 inches; the thickness of the garboard stroke is 6 inches, and the lower side of the main keel runs below it some 4 inches; at the distance of 2 inches above the lower edge of the keel, it is bolted athwartships every 8 feet 8 inches, with copper bolts $\frac{5}{8}$ inch in diameter, and riveted on the alternate sides of the keel; keelson of tough white oak, sided, 14 inches, molded, 14 inches; the scarfs of the keelson are 6 feet 6 inches in length and are bolted with copper bolts, $\frac{3}{4}$ inches in diameter, and doweled to the timbers; draft of water at load line, 7 to 8 feet; rig, schooner; tunnage, 458 tuns.

Spars.—Foremast, including head of $8\frac{1}{2}$ feet, 72 feet in length; mainmast, including head of $7\frac{1}{2}$ feet, 72 feet; foretopmast, including head of five feet, 43 feet; maintopmast, including head of 5 feet, 43 feet; bowsprit, outboard, 14 feet; bowsprit, inboard, 10 feet; foregaff, including head of 2 feet, 20 feet; maingaff, including head of 5 feet, 30 feet; main boom, 56 feet; square sail yards 42 feet.

Engines.—Back action, horizontal in direct acting, &c., all of the same dimensions and of the same motive power; number and diameter of cylinders, two of 30 inches; length of stroke of piston, 18 inches; diameter of air and circulating pumps, $10\frac{1}{2}$ inches; length, 32 inches; diameter of main journals of crank shaft, 7 inches; collars, 9 inches; length of each of the main journals, 18 inches; length of the center journal, 20 inches; where the eccentrics and the counterbalance are keyed on the shaft, it is 8 inches in diameter.

Boilers.—Martin's vertical tubular, two to each vessel; length, 12 feet 3 inches; width, 8 feet 3 inches; hight, 9 feet 3 inches; number of tubes in each boiler, 880; length of tubes, 28 inches; diameter, external, 2 inches; these tubes are expanded on one side of the tube plate, and riveted over on the other. Each boiler contains 2 furnaces, of three feet 5 inches width in the clear, with a grate 6 feet 6 inches long; hight from bottom of ash-pit to crown of furnace, 3 feet 3 inches; total grate surface, in boilers, 88 5-6 square feet; total heating surface, 2,700 square feet; the fire-grate bars are one inch in width on top, with $\frac{3}{8}$ inch spaces between them, and they are in two lengths of 3 feet 3 inches each: these boilers are made of the best quality American charcoal iron, with the best quality American lap-welded iron tubes; they are placed in the vessel, side by side, with a space of six inches between them, and have one smoke pipe in common to both; the smoke pipe is 48 inches in diameter, and 32 feet in length; before the boilers were placed in the vessel they were subjected to hydrostatic pressure of 60 pounds per square inch, and made safe and perfectly tight under it.

Condenser.—One to each vessel, Sewell's patent; the shell is of cast iron, $1\frac{1}{4}$ inch thick; the condenser contains 2,900 brass tubes of $\frac{5}{8}$ inch external diameter, and 42 inches exposed length, the total length being 4 feet; each end or the tubes are fitted with gum grommets; the tube plates are of brass, 2 inches thick, planed on one side, and they have faced strips for joint, on the other; they are in eight pieces, and bolted to faced flanges of condensers by brass bolts.

Propeller.—Diameter, 9 feet; diameter of hub, 15 inches length of hub, 2 feet 3 inches; thickness of blades at hub, $4\frac{1}{2}$ inches, tapering to $\frac{5}{8}$ inch at periphery; length of blade on hub, 15 inches, curving back on the forward edge 6 inches from a perpendicular to a length of 15 inches at the periphery; the after edge is curved parallel with forward edge, and the angle slightly rounded; pitch at forward edge of blade, $11\frac{1}{2}$ feet, expanding to $13\frac{1}{2}$ feet at after edge; mean pitch, 12 feet 6 inches; composition of screw propeller, by weight, 9 parts copper, 1 part tin, $\frac{1}{2}$ part zinc; number of blades, 4.

The hulls of these vessels are braced with diagonal braces of iron on the inside of timbers, $3\frac{1}{2}$ inches wide, by $\frac{1}{2}$ inch in thickness. There are two sets of braces at right angles to each other, one of which lets into the frame and is laid at an angle of 45° with the joint of it, the upper ends being 6 inches below the plank sheer, and the lower end at the turn of the bilge amidships. The other tier are laid on the timbers, and the inside plank jogs over them. There is also an iron strap, $3\frac{1}{2}$ inches wide by $\frac{5}{8}$ inches thick, running around the stem, and lying on the timbers above the turn of the counter timber, and extending forward within one frame of the forward sternpost. This strap is fastened to each timber, with bolts $\frac{7}{8}$ inch in diameter, and the planks jog over it.

The above mentioned vessels together with those reported in our last issue, have been launched and completed within a brief period. The following are still on the stocks, or about being commenced:—

AT JEREMIAH SIMONSON'S, GREENPOINT, L.I.

Preparations are being made at this yard to construct two first-class ferry boats for Commodore Vanderbilt. They are to run between New York and Staten Island, taking the place of the *Clifton* and *Westfield* recently sold to the United States government. Their machinery is in process of construction by the Allaire Iron Works, New York. Their principal dimensions are as follows:—

Hulls.—Length on deck, 225 feet; breadth of beam, molded, 34 feet, depth of hold, 13 feet 6 inches; frames, molded, 15 inches, sided, 7 inches, and 24 inches apart at centers; draft of water, 5 feet 9 inches; tunnage, 960 tuns.

Engines.—Vertical beam; number and diameter of cylinders, one of 36 inches; length of stroke of piston, 8 feet.

Boilers.—One, return flue; located in hold, and will use blowers.

Water Wheels.—Diameter over boards, 26 feet; material, iron.

AT HENRY STEERS'S, GREENPOINT, L. I.

A beautiful side-wheel steamer is being constructed at this yard, under the superintendence of Edward J. Dickerson, Esq. She was originally intended to run in conjunction with the Florida railroad, along the Gulf coast between Cedar Keys and New Orleans, but our domestic troubles caused a suspension of work upon it for several months. She has, however, recently been sold to the house of Messrs. Forbes & Co., China, and will, upon completion, take up her position upon the coast of that Empire. Her machinery is in process of construction by the Allaire Iron Works, New York.

Hull.—Length of keel, 270 feet; length in decks, 285 feet; breadth of beam, molded, 38 feet; depth of hold, 14 feet; depth of hold to spardeck, 20 feet; frames, molded, 18 inches, sided, 7 inches, and are 24 inches apart at centers; they are filled in solid under engine; draft of water at load line, 8 feet; tunnage, 1,998 tuns; rig, schooner.

Engines.—Vertical beam; number and diameter of cylinders, one of 76 inches; length of stroke of piston, 12 feet; to be fitted with Sickles's cut-off.

Boilers.—Two, return flue; length, 30 feet 3 inches; breadth, 12 feet, 6 inches; hight, 11 feet; located, in hold, and will not use blowers.

Water Wheels.—Diameter, over boards, 28 feet; face, 12 feet; material, iron.

This vessel is built of white oak, cedar and hacmetac. Her model is one of much beauty, and her easy and graceful lines betoken great speed. She has iron straps, diagonal and double laid, running around her frames, securing them in the best possible manner, and making the vessel one of great strength. When completed, she will be another proof of the skill of American shipbuilders and American mechanics.

IRREVERENT photographers in London are making fun of Spurgeon's recent Gorilla lectures, and have just issued a little card picture entitled, "Rev. C. H. Gorilla," and representing one of those interesting animals climbing a tree, as natural as life, only the head and white neckcloth of Spurgeon! This fascinating work of art is advertised in these words: "No Home without a Gorilla; a portrait of one from life should be in every home, as it creates so much merriment."

LOUIS NAPOLEON has given Professor Bunsen the decoration of an officer, and M. Kirchoff the Cross of the Legion of Honor, in recognition of their valuable discoveries in spectrum analysis.

UP to the hour of our going to press, 1 P. M., Dec. 19, the contents of the dispatches brought hither by the Queen's messenger to Lord Lyons had not been communicated to our government.

A MINE of cannel coal for making gas, has lately been opened at Manhattan Bay, in the island of Cape Breton. The place has been named in honor of the Manhattan Gas Company, New York city, which has contracted for several thousand tuns of the coal. One tun yields about 9,500 cubic feet of gas, and 40 bushels of coke. The gas is of very excellent quality.

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Inproved Holder for Bagging Grain.

The operation of putting grain into bags requires ordinarily the labor of two persons, one to hold the bag, and the other to pour in the grain. A cheap and simple little implement that will save the labor of one of these persons will effect an enormous economy in bagging the many millions of bushels of grain that are annually produced in this country. Such an implement has been invented and recently patented by A. M. Olds, and we present an illustration of it in the annexed engraving.

OLDS'S PATENT HOLDER FOR BAGGING GRAIN.

An upright standard, A, supported by a heavy iron platform at the base, is surrounded by a box or sleeve, B, which has a vertical motion up and down the standard. The sleeve is balanced by a weight hanging inside the standard, and it carries the jaws, C C, which support the bag and hold its mouth open. Each jaw has upon its lower and outer corner a spur wheel, *d*, and there are two similar spurs upon the lower corners of the hopper plate, E; these spurs being provided to catch into the bag and support it while it is being filled. As the bag rests at its lower end upon the floor, the spurs support only the weight of the bag; the weight of the grain being supported by the floor. The cord which sustains the weight within the standard passes around a pulley in the box, B, and is fastened to projections extending inward from the rear ends of the jaws, C; it is then led over a pulley in the outer edge of the box, B, and passing around a fourth pulley, in the upper end of the box, G, is secured at its outer end to the standard, A, at the top of the rod which serves as a guide to the box, G, in the vertical motions which this box receives.

When the workman wishes to attach his bag to the jaws, he places his foot upon the plate, F, which is fastened rigidly upon the side of the box, G, and, pressing downward, the jaws are drawn backward; the horizontal direction of the line from the point at which it is attached to the jaws securing this result. To prevent the sleeve, B, from being drawn down by this pressure, the board which forms its back side is shortened at the lower end, thus allowing the sleeve to tip and be clamped against the standard. As soon as the mouth of the bag is placed round the spur wheels the foot of the workman is removed from the plate, F, when the pressure of the weight within the standard being no longer counteracted, it draws the jaws forward and thus distends the mouth of the bag. The jaws, C C, are inclined at an angle diverging upward, and they consequently form with the plate, E, a flaring hopper or tunnel through which the grain is poured into the bag. The weight in the standard is so adjusted in relation to the weight of the sleeve, B, and its connections, that the few pounds of grain poured first into the bag, carry down the bag with the sleeve, B, so that the bag rests at its bottom upon the floor, with its upper end supported and distended as represented in the cut. After the bag is filled the jaws are drawn back by pressing the box, G, down, when the bag is easily removed and an empty one substituted in its place.

The patent for this invention was granted through the Scientific American Patent Agency, August 20, 1861, and further information in relation to it may be obtained by addressing the inventor, A. M. Olds, at Box 202, Chicago, Ill.

Fig. 1

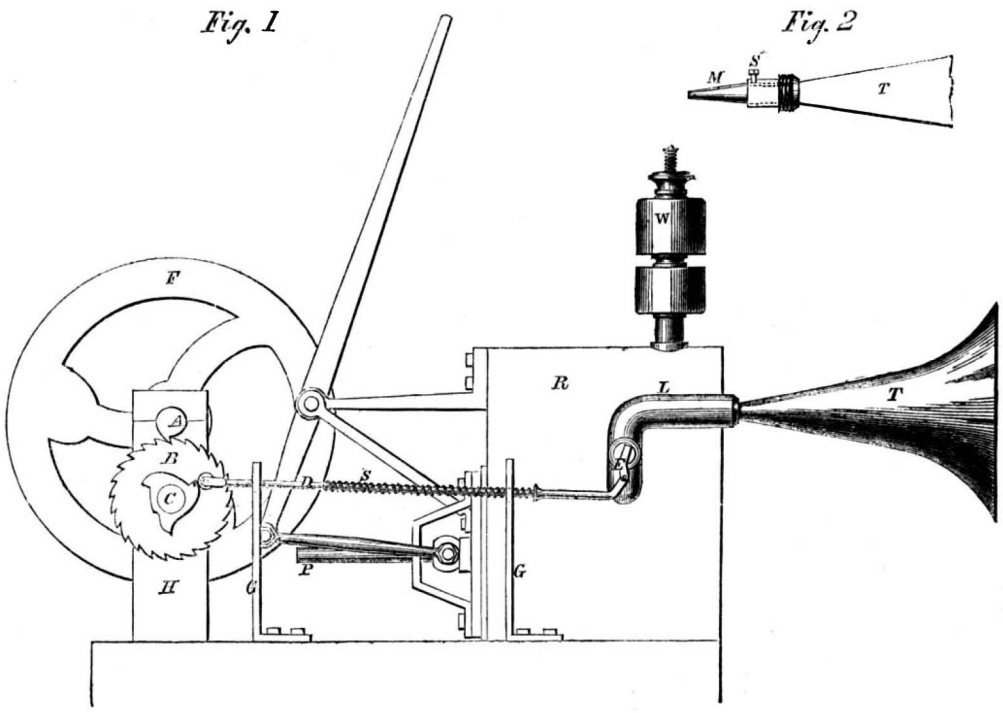

Fig. 2

DABOLL'S IMPROVED FOG ALARM.

Improvement in Fog Alarms.

There is nothing else that so completely bewilders a navigator as a fog. It cuts off all means of ascertaining his position, and prevents him from seeing rocks, vessels or other obstructions that may lie directly before him. Even the bright blaze of a lighthouse is completely obscured, and it is customary to imperfectly supply its place with a fog bell. The commanders of vessels too are in the practice of keeping their bells ringing during a fog to avoid the danger of the vessels coming in collision. But the bell gives a very uncertain sound, filling the whole air with its vibrations so that no idea can be formed of the direction whence the sound comes. The sharp, shrill scream of the steam whistle with its wonderful power of penetrating distances is far better suited to the purpose of a fog alarm, and is accordingly generally used on ferry boats and other steam vessels. But in many cases there are objections to the use of steam. Whenever the whistle has to be located at a distance from the boiler the steam condenses in the conducting pipe; and in situations where there is no engine the employment of a boiler for the purpose is expensive and dangerous.

Celadon L. Daboll, of New London, Conn., has invented an apparatus for blowing a trumpet or whistle with compressed air in place of steam, which is represented in the annexed engravings. A patent was granted for this invention on June 26, 1860.

Into a reservoir, R, air is compressed by means of a pump, of which the piston, P, is shown. A pipe, L, leads from this reservoir into the trumpet, T; the communication between the trumpet and the reservoir being closed by the valve, E, in the pipe. This valve is alternately opened and closed by the revolution of the wheel, F, acting through the mechanism represented. Upon the shaft of wheel, F, is a single toothed pinion, A, which catches into the teeth upon the wheel, B, and thus turns this wheel the distance of one tooth at each revolution of wheel, F. Upon the shaft of wheel B is a cam, C, pressing against the end of the rod, D, which is connected with an arm upon the axle of valve, E. The spiral spring, S, presses the rod, D, against the cam, E. It will be seen that as the cam, C, revolves, the valve, E, is alternately opened and closed, and by simply changing the form of this cam, any desired variation may be produced in the length and succession of the sounds.

Thus each vessel, lighthouse, or station may have its own peculiar signal, which cannot by any possibility be confounded with another. Or the Morse alphabet may be sounded by the apparatus and thus any message may bes ent through the fog.

Fig. 2 shows the manner in which the reed may be attached to the throat of the trumpet, by means of the schrew, S, so as to be easily replaced when defective.—The whistle, W, may beemployed in place of the trumpet if preferred. The air may be compressed by means of an air engine or other suitable power, and we should think the invention might prove very practical. In many situations these air whistles or trumpets must be decidedly preferable to either bells or steam whistles.

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VOL. V. NO. 26.....[NEW SERIES.]....*Seventeenth Year*

NEW YORK, SATURDAY, DECEMBER 28, 1861.

TO OUR FRIENDS.

NOW IS THE TIME TO FORM CLUBS.

The present number closes another volume of this journal. We appeal to its friends in all sections of the country where mail facilities exist to endeavor to form clubs for the coming year. We feel justified in asserting that no other journal in this country furnishes the same amount of useful reading, and especially at the extraordinarily low price at which it is furnished. Ten persons can club together and get the paper at $1.50 each for one year. Twenty persons clubbing together can have it at the rate of only $1.40. Think of getting a volume of 832 pages of useful reading matter, profusely illustrated with between 500 and 600 original engravings, for such a small sum of money. Single subscriptions, one year, $2; six months, $1. Even though the times may be hard, the long winter evening must be relieved of its dullness, and we must keep reading and thinking, and thus be prepared to overcome temporary difficulties and open new channels of wealth and prosperity. Friends, send in your clubs; at least renew your own subscriptions promptly.

See prospectus on the last page of this sheet.

WAR WITH ENGLAND.

The commercial shipping of the world amounts to about fifteen millions of tuns; of which England has about five millions, the United States about five, and all the rest of the nations combined about five. The nation ranking next to England and the United States is France, the commercial marine of which country amounts to about one million of tuns. A war between England and America would be a war upon the ocean, and would result in the utter destruction of the shipping of both nations. The vast industrial resources of these two great communities would be directed mainly to this work of destruction. England has just refused to accept our assent to the abolition or privateering, and all seas would soon be swarming with our clipper ships and steamers amply armed and crowded with men in search for the rich prizes to be found in English vessels. Like swarms of rovers would issue from English harbors to prey upon our commerce, and the rich carrying trade of the world would fall mainly into the hands of the French and Dutch. When peace shall finally be restored, and the little doubtful point of international law settled, England and the United States will be degraded from their proud preëminence, and France will be the leading commercial nation of the world.

It is to be hoped that the common sense of the two communities will save us from the immeasurable evils of a war between us. This country cannot desire a war with England at any time, and especially not at the present time. If the English people are content to have our naval vessels treat her mercantile ships as her cruisers have always treated our merchantmen, there can be no ground of quarrel between us. But if they seek by a mere quibble to force us to conduct different from that which they practice toward us, then they will find among us a spirit not inferior to their own. They should remember from whom we are descended. Sooner than yield to them any concessions not required by a fair interpretation of the law of nations, we shall accept the awful consequences of a war with them. The feeling of our people is well expressed by the remark of one of our merchants, the head of a firm that owns as fine a lot of vessels as sail out of this harbor. He says, "I have eleven ships on the line between this port and Liverpool, and I would sooner see them all rot at the wharves than to have Mason and Slidell surrendered."

THE OLD YEAR'S PROGRESS.

At the close of the year eighteen hundred and sixty we congratulated our readers upon a year of unexampled national prosperity. Never before had the fields and orchards of our husbandmen yielded so profusely, or our manufacturers and merchants enjoyed a period of more profitable success. It would have afforded us intense pleasure had we been able to close our present volume in the same tones of peaceful gladness; but in thousands of workshops, factories and farms, the hammer, the saw and the plow have been laid aside for the sword, the rifle and the cannon, and our country has become one vast camp of armed men. Fierce battles have been fought, and many brave men have fallen, and now "sleep the sleep which knows no waking" Still there is much to cheer and awaken faith and hope for the future. Many philosophers believe that wars are tribulations which exert similar influences among the nations that thunder storms do upon the atmosphere. They are evils while they exist, but when the clouds are dispersed, men breathe a purer and more serene atmosphere. May this be the happy consummation of our national troubles!

Although the vast insurrection has exerted a disorganizing influence upon many manufactures and other branches of business, it is really wonderful to witness the elasticity of our people, and the facility with which they have adapted themselves to altered circumstances. Many old branches of industry have been destroyed, but new ones have sprung up, and there is now a great amount of industrial prosperity enjoyed in most of the manufacturing sections of our country.

The war has stimulated the genius of our people, and directed it to the service of our country. Sixty-six new inventions relating to engines, implements and articles of warfare, have been illustrated in our columns, with no less than one hundred and forty-seven figures. These embrace a great variety of cannon, rifles, shells, shot, tents, kits and almost all articles found in the military vocabulary. Rodman's monster cannon, Dahlgren's howitzers, De Brame's revolving cannon, Winslow's steel cannon and several others have been thus brought before the public. No man can really be intelligent in matters relating to modern warfare unless he has made himself acquainted with these inventions.

Other departments of industry have also been well represented. Our inventors have not devoted themselves exclusively to the invention of destructive implements; they have also cultivated the arts of peace. In the present volume of the SCIENTIFIC AMERICAN —extending only over six months, one hundred and sixty different subjects have been illustrated, averaging from three to four figures each. It would take up too much space to enumerate all these, but in thus summing up our yearly progress in a general way, we can safely assert that for original and well-studied efforts of genius, they equal if they do not surpass the inventions of any former year. And as the number of patents issued is a very good exponent of the progress of our country, we can point to no less than 2,919 which is equal to the number (2,910) issued in 1857—four years ago. When the defection of eleven States, and the distractions of our country are taken into consideration, it is not too much to assert that our inventors have done better last year than ever before, and that inventions are perhaps the most safe and profitable sources of investment in times of war as well as peace.

Considering the nature and extent of the tremendous struggle in which our country is engaged, we have really great reason as a people, to feel grateful, and call this a prosperous year after all. Never before have our fields yielded so bountifully. The great West is surcharged with wheat and corn, and we are in the happy condition of enjoying a surplus of the necessaries of life. In thus viewing the past, we can still say with cheerfulness, thy face, old year, has been deeply furrowed by scars and tears, but it has also been illuminated with many sunny smiles.

A FEW WORDS TO OUR SUBSCRIBERS ON THE CLOSING VOLUME.

We are now at the close of another volume of the SCIENTIFIC AMMRICAN, and shall commence a new one with our next issue. The subscription term of nearly five thousand readers will expire with this number, and with more than our usual solicitude we request a renewal of their patronage. We feel encouraged in doing this as we have received the most gratifying assurances from all our correspondents, that the SCIENTIFIC AMERICAN has been conducted during the past year, with even more than its former acceptability. It has furnished profitable and attractive information we trust, to all its readers, and its illustrations and typography are unequaled by any other periodical devoted to the literature of the mechanical arts. It has been the aim of its publishers and editors to make it a creditable representative of American invention and enterprise, and it is universally admitted that it occupies this position and stands alone as the popular expositor and repertory of American art and science. It is a periodical respecting which our mechanics generally have said they "feel proud of it, and it deserves the patronage of all." As it is impossible to maintain such a large, and cheap illustrated, paper without a very extensive list of subscribers, we solicit all our readers to exert their influence and to labor more than usual this year, to obtain for us new subscribers among their acquaintances. We know "the times are hard" with many of our mechanics, but the sum required for subscription is so small that almost every one can afford it with a little self-sacrifice, and we are confident it cannot be invested to a more profitable purpose.

The proprietors of the SCIENTIFIC AMERICAN will spare no effort to render the next volume acceptable to all its readers, and if possible superior to its predecessors. According to our established rule, the paper will be discontinued to all whose subscriptions have expired, but we hope to experience the satisfaction of not being required to erase a single name from our mail books.

THE CHEMISTRY OF IRON.

With this number, which completes the volume, we bring to a close our series of articles on the chemistry of iron. The subject is by no means exhausted, but we have described those compounds of iron which are most common, and which, consequently, are of the most general interest, and we have illustrated the most important principles of chemistry.

If we thought it would be interesting to any considerable number of our readers we should follow these articles by a series on the chemistry of coal; beginning at the foundation, as in the articles on iron, and tracing the subject through the production and composition of coal oil, illuminating gas and coal tar; and following the last complex substance into some of its most remarkable products, especially the new brilliant aniline dyes. This would lead us to an account of the latest discoveries in chemistry, which have not found their way into books, and we should endeavor to make all the subjects as plain as we have the compounds of iron.

We have some doubts, however, in regard to the extent to which these serial articles prove acceptable, and shall not commence a second series without waiting a little to hear from those of our subscribers who read with any interest our articles on the chemistry of iron.

AN alloy of 78.26 parts of brass, 17.41 of zinc, and 4.33 of silver, with the addition of a little chloride of potassium to the borax, is recommended as the best solder for brass tubes, which have to undergo much hammering or drawing after joining.

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WAR AND SCIENCE.

In reading the histories of wars in other countries we are apt to get the impression that any war during its continuance was the sole, or at least the principal business of the community. Especially is this the case with civil wars. During the wars of Cromwell, when one half of the people of England were contending against the other half, when powerful armies were marching all over the kingdom and bloody battles were succeeding each other in rapid succession, when the monarch's sacred head was cut from his shoulders, and the ancient constitution of the realm was overthrown and a new form of government established, it is difficult for us to realize that but a very small fraction of the community was diverted in the least from their ordinary pursuits, and that the industry of the people was so little disturbed that the wealth of the nation increased during these years of civil war more rapidly than it ever had before. And yet there is no doubt that this was the case.

The civil war now in progress in this country is of larger dimensions than any other of which history has preserved the record. In the wars between the generals of Alexander which took place after his death; in the struggle between Octavius and Brutus after the death of Julius Caeser, in the extermination of the Vendeeans during the French revolution, or in the great civil war now raging in China, the armies have never equaled in mere numbers those which have been mustered and are now being drilled for the great struggle which is to decide the fate of this nation. As our hosts are furthermore amply supplied with the most approved implements of modern warfare, and as they are organized and guided by men educated in every department of military science, our armies are several times more powerful than any which have ever been drawn from opposing factions in any other country. To an extent unprecedented in the history of the world, this nation has devoted itself at the present time to the work of war.

And yet how steady is the progress of knowledge and science in the midst of this mustering of armies! Throughout at least all the Northern States, almost all of the children take their way daily to the public schools, where they are securing our democratic institutions for the generations to come upon the broad and stable foundation of popular education. The directors of our colleges and seminaries are surprised at the large numbers of their pupils, and publications devoted to science and arts are steadily sustained by the community.

The most sublime scene ever witnessed by man is a storm at sea. The largest ship, so enormous in proportion to the size of the men who have built her, appears in the boiling ocean like a drop of the brine or a bubble of the foam. And when from the decks another vessel is espied amidst the storm, at one moment tossed to the sky, and at the next buried out of sight in the valleys between the billows, and yet holding steadily on her way, the spectator who witnesses the scene for the first time always regards it as the grandest and most impressive of all possible exhibitions of human constancy and resolution.

Similar emotions are excited by the unwavering progress of science in seasons of political and social confusion. Amid the waltz of navies to the music of cannonades, amid the gathering of hosts, the tramp of armies, the burning of cities, the shouts, screams and thunder of battle, Science, like a brave ship in the gales of the Atlantic, or like a divine angel, serene amid the storm, moves calmly onward in her beneficent labors, her course obstructed, indeed, but undiverted by the turmoil around her.

Back Numbers and Volumes of the Scientific American.

Volumes I. II. III. IV. V. complete, except Nos. 7, 9, and 15, of volume III., which are out of print—(bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which includes postage. Price in sheets, $1. Every mechanic, inventor, or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

We are prepared to bind volumes in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express, or delivered at the office, 40 cents.

SPHERICAL SHOT vs. ELONGATED PROJECTILES.

In another part of this paper will be found an account of some experiments in England with the *Prince Alfred* gun, a wrought iron cannon of 10-inch caliber throwing a spherical shot. It will be observed that the statement is made that the most effective projectile previously employed, was a 68-pound shot from the old service smooth-bore cannon. This shot proved more destructive to iron-plated targets than any of the elongated 100-pound projectiles from the Armstrong or other rifled cannon. We have copied the same statement from other English papers, and it accords with the conclusions long since arrived at by the ordnance officers of our army and navy. It is rather surprising to see the English and French—so much in advance of us as they are in the size of their navies, and in many military matters—so far behind this country in the construction of heavy ordnance. While our ships and forts have long been armed with 8, 9, 10, and 11-inch guns, and while we have demonstrated the practical success of one 15 inches in diameter, throwing a shell weighing ing 420 pounds, the English are slowly experimenting with a gun of 10 inches bore, throwing a 140-pound shot.

It will be observed that in this, as in other experiments, the cast-iron ball was broken in pieces by striking against the wrought-iron plate. Captain Rodman thinks that large balls cast solid, are not as strong as if cast with a small cavity in the center. When cast solid, as the outside cools first it forms a rigid shell which cannot contract, and then as the interior cools, it shrinks into a porous mass which is very weak. Why could not the balls be cast hollow, and the cavity be then filled with type metal or some other alloy of antimony that would not shrink in cooling?

ADJUSTABLE PIPE WRENCH.

A common square wrench is unfit for screwing up round pipes that fit into one another with screw joints; and the common wrenches for round pipe are generally adapted for only one size of pipe. The accompanying engraving represents a wrench which can be adjusted with facility to suit pipes of different sizes, so as to grasp and turn each without slipping. On the shank, A, is a small rack, C, and also upon it a sliding sleeve, D, which has a tooth, *b*, and a wrench jaw, E, the latter having an eccentric, *d*, on its inner end. The tooth, *b*, holds the sleeve, D, in any of the teeth in the rack, so as to expand or contract the jaw, E, relatively with the jaw of the shank, A, and turn the pipe, *a*.

In this manner the wrench can be readily adjusted for operating on different pipes. Patented by J. H. Doolittle, Ansonia, Conn., March 27, 1860.

Russian Sheet Iron---A Field for a Fortune.

The Philadelphia *Gazette* says:—"Few persons are aware of the enormous expense and difficulties attending the importation of Russia Sheet iron into this country, and the quantity consumed. The uses to which this iron is applied are mainly in the manufacture of stoves, the difference in its favor, in point of durability, being very great. The imitations that have been attempted in this country have been hitherto so unsuccessful that a field of discovery lies still open in this department, in which some future inventor will yet, doubtless, realize a princely fortune. That much of *American* Russian Iron is sold for the genuine is true enough, the imitation in outward appearance being so close almost as to defy detection by any other than an experienced judge. The imitation in this respect has been very complete; but the art of making it wear and not oxidize from exposure to dampness is still to American manufacturers a hidden secret. The indestructible quality of the Russia-made sheet iron is really extraordinary. We have seen stoves manufactured of it which had been in use for a period of thirty years with the sheets almost imperceptibly reduced in thickness. From these facts it is obvious that stoves made of the genuine Russia iron are vastly cheaper, at almost any cost, than those manufactured of the imitations, which burn out in a season or two and give less heat."

Great Waste of Coal---New Machines Wanted.

In a communication to the *United States Gazette* (Philadelphia), P. W. Sheafer, engineer of mines, directs public attention to the great waste of coal caused by common coal breaking machines. He states that a series of experiments, costing one thousand dollars, were made at the Lehigh Company's mines, to obtain reliable data, and Mr. Winterstein, who conducted the experiments, says, respecting them:—

I passed through a clear vein coal, which is hard coal—the best we have. Before we commenced the experiment we had the dust all swept away from the breakers and screens; we selected only large coal, so that every piece would have to be operated upon before it could pass through the breaker. The dust was swept down after every experiment. In some of the experiments we put through 40,000 pounds, some 20,000, some 8,000, and the smallest was 2,000 pounds of coal. The screen which selected this coal after it had passed through the breaker was about 27 feet long, and of a diameter of five feet. The broken coal is carried throughout the entire screen, and is deposited from its outer end. The egg coal passes through a section of the screen six or seven feet long, having a mesh 2¼ inches square. The stove coal passes through a section eight or nine feet long, having a mesh 1¾ inches square. The nut coal passes through a section ten feet long, having a mesh 1 1-16 inches square. The waste passes through a ½-inch square counter mesh.

No less than thirteen different machines—coal breakers—were tried, and the smallest loss on the best two was 17·6 per cent of waste, beside 10·84 per cent of fine chestnut coal; the waste with the six next best breakers was 24·07 per cent and 17·75 per cent of chestnut coal; with the five other machines the waste was 26·24 per cent and 14·82 of chestnut coal. Respecting this great loss, caused by coal-breaking machines, Mr. Sheafer says:—

For every 1,000 tuns mined the operator and landlord lose, in waste, 264.04 tuns, or in every 100,000 tuns 26,-240 tuns.

Taking a year's business in Schuylkill county, say the year 1859, and there were shipped 3,048,615 tuns; loss at the breakers, 26.24 per cent, 799,956 tuns, giving us as the total product of the mines in Schuylkill in 1859, 3,848,751.

We are warranted in adding this loss to all the coals mined in the first district of the anthracite coal fields, embracing Schuylkill, Pinegrove, and the Lower Lehigh, as well as those of the second district, viz., Upper Lehigh, Mahanoy, Shamokin and Trevorton, from which were shipped in 1859, 5,107.203 tuns; loss at the breaker, 26·24 per cent. 1,340,130 tuns, and yielding as the total product of the mines in the first and second anthracite coal districts of Pennsylvania, 6,447,333 tuns.

It may be confidently said that this enormous loss is not exaggerated.

Were I to estimate the loss on our total shipments of anthracite from the three districts, from 1820 up to January 1, 1860—say on 83,791,279 tuns—at but 20 per cent—say 16,758,255 tuns—the total product being 100,549,533, it shows an enormous loss to landowner, operator and transporter. It is more than a total loss of so much carbon, as it encumbers our working ground, obstructs our highways, fills up our canals, and spreads in all the streams, from the mines to the bays of the Delaware and Chesapeake.

These 16,000,000 tuns of coal lost is more than so many dollars lost.

To the landholders	$ 4,000,000
The operators also lose	8,000,000
And the transporters	12,000,000
Total loss	$24,000,000

This waste by breakers, crushers or destroyers began in 1844, when Mr. Gideon Bast erected the first breaker of the Battin pattern at his Wolf creek colliery. Previously to this time breaking coal by use of rolls was practically unknown in Schuylkill county. It was broken by hand, upon platforms, generally having openings through which the coal passed to the screens, or shipped to market in the respective sizes in which it was taken from the mine. By these primitive means, up to the year 1844, no less than 1,607,109 tuns were sent to market from the anthracite districts. A certain amount of waste is unavoidable. But the question of importance in this matter is, can this great loss of coal be avoided, and if so, by what means?

The ingenuity of practical machinists has been brought into requisition, and the above table demonstrates the fact that great waste attends their best efforts.

Here we have a challenge, as it were, given to all our inventors to invent an improved coal breaker that shall reduce the enormous waste caused by the machines at present in use.

Exhibition of Corn Bread.

An exhibition of 200 loaves of corn bread was held during the latter part of last and the beginning of this week, at the office of the *Agriculturist*. 41 Park Row, in this city. Each loaf was accompanied with a statement of its ingredients, the mode of mixing them, and the manner of baking. These loaves were made by nearly as many different persons, who were candidates for prizes of ten, five, four and two dollars, for the four best loaves. A large number of persons visited the exhibition which was of a very interesting and novel character

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RECENT AMERICAN INVENTIONS.

Breech-Loading Cannon.—This invention relates to the employment, for opening and closing the breech of a piece of ordnance, of a sliding breech-block, having a movement perpendicular to the bore of the piece, and it consists in an improved mode of producing the movement of the said breech-block, whereby it is effected with very great facility. Invented by L. W. Broadwell, of St. Petersburg, Russia.

Steam Plow.—This invention, patented by J. W. Fawkes, of Decatur, Ill., consists in combining a stationary and a traction engine with plows or excavators in such a manner that the plows are drawn along through the soil when the engine is stationary, the power being applied direct to the plows, and the plows drawn up to the machine or engine, the latter being then converted into a traction engine, and propelled along, while the plows are stationary, in order that the plows may be again drawn forward by the engine, after the same is converted into a stationary one. The invention is more especially designed for performing heavy work, such as ditching and plowing with heavy gang plows, &c.

Cloak and Mattress Combined.—The object of this invention is to combine a cloak or overcoat and mattress or bed in such a manner that the device when used as a cloak or coat may be used as usual and possess all the advantages of the ordinary military cloak or coat, and be capable, when required, of being readily converted into a mattress or bed with suitable covers for the occupant, enabling him to sleep in the open air without a tent. It is designed also that the invention be capable of being used as floats in the construction of temporary or flying bridges, and also to serve, where necessary, as floats to enable the soldiers individually to pass over the moats of fortifications, and like places, in perfect safety. Each cloak or coat when inflated forming a float for its wearer or owner. The invention consists in having a cloak or coat constructed of india rubber cloth or other suitable fabric, in the usual or other proper form, the cloak or coat being provided with an air bag or compartment in its back, which is inflated when the device is used as a mattress or float, the air being allowed to escape when the device is to be used as a cloak or coat. Patented by F. W. Weiss, of Mount Vernon, N. Y.

Gas Regulators.—This invention, the merits of which are due to Levi Abbott, of Boston, Mass., consists in making the regulating valve and valve seat of a gas regulator of vulcanized india rubber, upon which, owing to its being a poor conductor of heat, the vapors contained in the gas are less likely to condense than they are upon a metal valve and seat, and by which, therefore, the liability to the choking of the passage between the valve and seat is in a great measure obviated. It also consists in forming a guide for the valve stem, by providing a suitable hole for the reception of the lower part thereof in the center of the screw which is applied at the bottom of the stem to regulate the greatest width of opening of the valve, thereby dispensing with the necessity of a guide across or above the valve seat, and obviating the obstruction which is offered to the passage of the gas by the cross bar which supports or contains such guide

Car and School Seat.—The object of this invention is to obtain an adjustable seat with a reversible back, the parts being so arranged that the seat will be adjusted and inclined at the proper angle by the movement of the back to either side of the seat. The invention also has for its object an independent adjustable rest or back support, so arranged as to admit of the back of the occupant of the seat being properly supported irrespective of the position of the side pieces of the back, thereby enabling the latter to be connected to the framing and supports of the seats at the most convenient point to effect the desired end. Invented and patented by W. H. Joeckel, of New York city.

Gas Retort.—This invention relates to upright retorts for the manufacture of gas from oils or other liquid substances, or substances which are rendered liquid by heat. In such retorts it has been customary, and is generally very desirable to use a quantity of coke or other substance in lumps for the two purposes of presenting a large heating surface for the decomposition of the liquid and of collecting the residuary carbon and impurities which would otherwise cake and collect upon the botton of the retort. This substance requires to be changed from time to time to remove the residuum of the liquid, and has, heretofore, generally, if not always, been removed piece by piece or by shovelfuls at some inconvenience. The object of this invention is to remove the whole of the said substance at once, and to this end it consists in what may be called a coke box or coke basket attached to the cover of the retort for containing the said substance, the whole of which is thereby enabled to be removed at once by the simple act of taking off the cover of the retort. Invented and patented by A. K. Tupper, of Pontiac, Mich.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, exception reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING DECEMBER 10, 1861.

Reported Officially for the Scientific American.

THE PRINTING OF PATENTS ABANDONED.

The plan adopted by Commissioner Holloway of printing the specification which forms part of the Letters Patent, he has been obliged to abandon owing to the reduced receipts of the Patent Office. Hereafter, for a time, the specifications will be engrossed on parchment as formerly. This change will obviate the great delay which has attended the issuing of patents after sealing, but the papers do not go out looking so neatly. We hope the receipts of the Office will soon justify the extra expense which attended the printing.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,869.—Levi Abbot, of Boston, Mass., for Improvement in Gas Regulators :

I claim, first, The construction of the valve and valve seat of a gas regulator of vulcanized india rubber, substantially as and for the purpose specified.

Second, Forming a guide for the valve stem within the regulating screw, E, applied at the bottom of the stem, substantially as specified.

2,870.—J. R. Baylis, of Baltimore, Md., for Improved Double Cone Marine Propeller :

I claim the construction of a double cone propeller, having its oars or blades constructed, and when arranged relatively to the hub or axis, substantially as and for the purpose described.

2,871.—Edwin Bowen, of Meriden, Conn., for Improvement in Mode of Securing Chimneys to Lamps :

I claim the slide, D, fitted horizontally in the lamp top, A, provided with a hook, a, at one end, and having a spring, E, bearing or acting against it within the top, substantially as and for the purpose set forth.

[The object of this invention is to obtain a fastening or catch which will admit of the chimney being readily adjusted on the lamp top, and also readily detached therefrom, the fastening or catch at the same time being capable of firmly securing the chimney to the lamp top.]

2,872.—L. W. Broadwell, of St. Petersburgh, Russia, for Improvement in Breech-Loading Ordnance :

I claim the employment for elevating and depressing the breech block, B, for opening and closing the breech of a shaft, g, arms, h h, and links, i i, the whole combined, arranged and operating substantially as specified.

2,873.—L. J. Chateau, of France, for Improved Machine for Breaking the Subsoil :

I claim, first, The breaking instrument constructed and arranged as specified.

I also claim connecting the breaking instrument with the carriage by means of a compound reach pole, as described.

I also claim, in combination therewith the regulation; i, in the manner and for the purposes set forth, and I further claim, in combination with the apparatus specified, the hoist for elevating the breaking apparatus, as described.

2,874.—John De Long, of Monroe, Wis., for Improved Washing Machine :

I claim the employment of the adjustable hinged frame, B, forming both a lever and rubber when constructed, and arranged to operate with the box, A, as and for the purpose specified.

2,875.—H. H. Dickinson, of Hartford, Conn., for Attachment to Kerosene Lamps :

I claim the adjustable tube or thimble, C, surrounding the round wick tube of an ordinary lamp, said thimble being of conical form at top, and having points, b e, and interstices, a a, at the top and bottom, operating in the manner described for the purpose set forth,

[The object of this invention is to obtain a simple and economical device, which can be applied to any lamp having a round wick tube to adapt it for burning coal oil, kerosene and other carbonaceous fluids, without a chimney, and the invention consists in a thimble attachment to the wick tube of a lamp adapted to deliver a current of heated air to the flame.]

2,876.—G. D. Dows, of Boston, Mass., for Improved Soda Apparatus Combined with an Ice Cutter :

I claim, first, The arrangement for cutting ice, of one or more cutters placed in a vertical cylinder, when the same are so arranged as to permit the passage downward of the ice, and are in combination with substantially the screw shafts, T and S, nuts, X X, and follower, Y Y.

Second, I claim the arrangement of the ice cutter, substantially as and for the purpose described, when the same is in combination with the enveloping chest, A A A A, sirup vessels, B B, and cream chest, H.

Third, I claim the combination of the cream chest, Hx, the enveloping chest, A A A A, the ice chest, C C C C, and sirup vessels, B B, all arranged, substantially as and for the purpose described.

2,877.—Jacob Early and J. B. Parvin, of Hightstown, N. J., for Improvement in Seeding Machines :

I claim, first, The reciprocating slide, G, formed of the adjustable perforated plates, e e, in combination with the stationary cut-off brush, F, and perforated bottom, c, of the seed box, E, all arranged as and for the purpose set forth.

Second, The combination and arrangement of the parallel adjustable

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bars, K, oblique braces, L, plow standards, M, and levers, N N, substantially as and for the purpose set forth.

[For illustration and description of this invention see page 328 of the present volume.]

2,878.—J. W. Fawkes, Decatur, Ill., for Improvement in Steam Plows:

I claim, first, The combination for the purpose of plowing, ditching, &c., by steam, of a stationary and traction engine, windlass attachment and plow frames, substantially as set forth.

Second, The peculiar arrangement of the geared drum, B, shifting wheels, R R, and geared rollers, Z' Z'', which form a windlass, substantially as shown and described, for the purpose of readily changing the engine from a traction to a stationary one, and *vice versa*, when said windlass and engine are used in combination with plows, for the purpose specified.

Third, The adjustable draught bar, C', of the frame, B', arranged substantially as shown, to admit of the adjusting of the frame, B', for the purpose described.

2,879.—C. J. Glenn, C. Ball and U. S. Hackett, of Unadilla, Mich., for Improvement in Stump Extractors:

I claim the employment of the levers, C and D, the cords, E and F, the block, G, and the pulleys, a a d, constructed and arranged for extracting grubs and stumps, substantially as specified.

2,880.—W. H. Guynne, of Brooklyn, N. Y., for Improvement in Machinery for Rifling Guns:

I claim, first, The direct application of hydraulic pressure for the purpose of rifling guns.

Second, The combination of the hollow shaft, F, expanding rod, E, cutters, D D, piston, C, the whole operating substantially as described and shown.

2,881.—Thomas Holmes, of Williamsburgh, N. Y., for Improvement in Embalming:

I claim the combination of the chamber, B, inclosed pump, C, and regulating stop cock H, in the manner and for the purpose stated.

2,882.—Benjamin Hoyle, of Martin's Ferry, Ohio, for Improvement in Thrashing Machines:

I claim, in combination with a thrashing machine, the combination and arrangement of the shoe, J, screen, g, and fan, K, over the straw carrier, to rescreen and refan the grain and deliver the tailing to the thrashing cylinder, substantially as described.

2,883.—W. H. Joeckel, of New York City, for Improved Seat for Railroad Cars and Schools:

I claim, first, The reversible side pieces, b b, attached to the seat supports, A A, at the points specified, in connection with the independent adjustable rest or back support, D, arranged substantially as and for the purpose set forth.

Second, The combination of the side pieces, b b, and adjustable seat, B, attached to the support, A A, and arranged to operate as and for the purpose set forth.

2,884.—H. W. Johnson, of Athens, Pa., for Improved Washing Machine:

I claim, first, The inclined ways, b b, and friction rollers, a, in combination with the bearing strips, e, and springs, f, as and for the purpose specified.

Second, The clamping and stationary-holding bars, i j and m, in combination with the intervening corrugated or fluted sections, h, as and for the purpose set forth.

Third, The clamping and stationary-holding bars, i j and m, in combination with the opening, n, in the cylinder, as described.

Fourth, The hollow cylinder, with its opening, n, in combination with the external corrugations, h, and the concave corrugated or fluted bottom, B, of box, A, as and for the purpose described.

2,885.—W. C. Kneeland, of Brooklyn, N. Y., for Improvement in Cigars:

I claim, as a new article of manufacture, a smoking cigar, produced from fine cut tobacco, inclosed first within a tube of silk or other tasteless and inodorous materials, and afterward covered with a wrapper of tobacco in the manner described.

2,886.—Edward Kirk, of New York City, for Improvement in Cook Stoves:

I claim having the flanch, E, which receives the smoke pipe formed on one of the lids or covers, D, of the pot holes, and arranging the dampers and flues of the stove, substantially as shown, or in an equivatent way, to admit of a direct draught or a circuitous one around the oven, C, in either positions of the lid or cover, B, for the purpose set forth.

[The object of this invention is to obtain, by a very simple means, a cook stove, which may, in a short time, be converted from a winter to a summer stove, and *vice versa*.

2,887.—P. F. Jones, of New York City, for Improvement in Operating Heavy Guns:

I claim the cog circle, B, in combination with the pinions, L and N, or either of them, when constructed as described, and used in connection with the traverse circle, A.

I also claim the cogged semicircle, C, attached to the chase or neck, and to the case abel as described, in combination with the worm, A, as and for the purpose set forth.

I also claim the fixed circular, slotted scale or gage, D, when constructed and arranged substantially as specified.

I further claim the cogged semicircle, C', and worm, A', in combination with the fixed circular slotted scale or gage, as described.

And, lastly, I claim the cogged circle, B, with its pinion or pinions, in combination with the cogged semicircle, C', and worm, A', as and for the purpose indicated.

2,888.—Henry Killam, of New Haven, Conn., for Improved Stop for Coach Doors:

I claim the curved bar, F, slide, G, and guide rod, H, arranged as shown, and applied respectively to the door, A, and seat rail, E, as and for the purpose set forth.

[This invention is designed to prevent coach doors opening beyond a certain limit, the same being a plane at right angles with the side of the body, whereby the door is prevented from coming in contact with the back wheel of the vehicle, and the stop so arranged as not to interfere with glass windows, when the same are made to extend quite low in the sides of the body, as is frequently the case.]

2,889.—Eugene Lacroix, Jr., of Rouen, France, for Improved Marine Propeller:

I claim the combination of a propeller, mounted on a sliding frame, as set forth, so as to be raised and lowered within a recess in the stern of the vessel, so that said sliding frame shall receive its support from the sides of the recess, to strengthen and brace the frame and protect the propeller, as and for the purpose as described.

2,890.—C. W. Lord, of New York City, for a Pen and Pencil Case:

I claim, as a new article of manufacture, a pen holder and pencil case, having metallic conical thimbles, b, arranged in the bottom of each of its several compartments when constructed, combined and operating in the manner and for the purpose set forth.

[The object of this invention is to obtain a case for pen holders, pencils and similar articles, of such dimensions that it may be carried in any pocket of a garment without inconvenience to the wearer, and without liability of injury to the points of the pens or pencils.]

2,891.—Lewis Miller, of Canton, Ohio, for Improvement in Grain and Grass Harvesters:

I claim, first, In combination with the main frame, having drooping ends, a tie rod, that may serve as a hinge for the coupling arm and brace, substantially as described and for the purpose set forth.

I also claim, in combination with the widening out of the rear portion of the main frame end of the finger bar, a, brace, m, for the purpose of making a long hinge and strong connection between the finger bar and coupling arm, without the use of an intermediate shoe, substantially as described.

I also claim, in combination with a finger bar that is made in two sections longitudinally, a cutter and cutter bar, also made in sections, so that the finger bar and cutters may be shortened or lengthened, for cutting grass or grain, as described and represented.

I also claim, in combination with a pivoted or hinged track clearer, the slot, set screw and shoulder, or their equivalent, for the purpose of controlling the descent of the track clearer while it is in operation, and for allowing it to be swung up and held up, out of the way, when the machine is being transported from place to place, substantially as described.

2,892.—H. W. Miskinien, of Kingston Mines, Ill., for Improved Automatic Gate:

In combination with the gates, I claim the mechanism described for opening and closing them, consisting of the rock shafts, arms, links and weight, constructed and arranged as set forth.

I claim the hinged vibrating plank at the end of the platform, in combination with the levers, e e, and locking lever, a, constructed to operate as described, for the purpose set forth.

2,893.—Charles Montague, of Hartford, Conn., for Printing Press:

I claim, first, the combination of two cylinders for letter-press printing in different colors, whereby a sheet once fed to the small cylinder is printed with various colors before leaving the press, for the purpose and substantially in the manner described.

Second, Interchangeable ink rollers in combination with the cylinders, A B, to ink the different forms with different colors, for the purpose and substantially in the manner described.

2,894.—D. A. Moore, of Syracuse, N. Y., for Improvement in Lamps:

I claim the entire arrangement for raising and lowering the sliding tube, B, and wick, for the purpose of regulating the flame. In this arrangement I include the slit, C, in the internal tube, B, the wire or metallic strip, G, the attachment of this wire to the sliding tube, D, the concave plate, I, the funnel, K, for guiding the wire or strip through the aperture in the plate.

2,895.—Charles Morrill, of New York City, for Improvement in Bit Braces:

I claim the bit brace head, A, and cam, B, in combination with the spring, D, as described for the purpose specified.

2,896.—C. L. Pascal, of Philadelpia, Pa., for Improvement in Military Hats:

I claim a military hat having the reversible flap, B, formed and arranged substantially as described, when the ends of the said flap are constructed for attachment to and detachment from the peak or shade, C, in the manner and for the purpose specified.

2,897.—Alfred Pohns, of France, for Improved Camp Bedstead. Patented in France, April 23, 1861:

I claim the X-shaped supports provided with the metallic dowels or tenons, e e f f, entering the ends of the metallic tubes, B C D B' C' D', in the manner and for the purposes specified.

2,898.—David Pollock, of Lancaster, Pa., for Improvement in Connecting Rods for Locomotives:

I claim, first, A metal rod when made flexible and combined with a yoke or stops for the purpose of regulating it to any degree of flexibility or tension, substantially as and for the purpose set forth.

Second, A strap with adjustable or movable inner projecting plate, when combined with a metallic rod and boxes, as and for the purpose specified.

Third, The raised or widened outer edges, or sides of the strap in combination with the metal rod and boxes, in the manner shown and described.

Fourth, Corresponding projections on the sides at the end of the rod, in combination with a strap, as shown.

Fifth, The reversed keys, when combined with the metal rod, strap and boxes, as set forth.

Sixth, The adjusting conical-pointed set screws and cup, for the purpose set forth.

2,899.—J. H. Pomeroy, of Jordan, N. Y., for Improved Steam Engine Governor:

I claim, first, In such governor the combination of the wings, K K, with the inclines, H H, arranged and operating substantially as described.

Second, I claim the combination of the wings, K K, with the inclines, H H, and the wheels or rollers, f f, arranged substantially in the manner and for the purpose described.

Third, I claim the combination of the wings, K K, the inclines, H H, the wheels, f f, and the rod, J, the whole operating for the purpose and substantially in the manner described.

2,900.—R. D. Porter, of Zanesville, Oho, for Improvement in Curry Combs:

I claim the mode of fastening the teeth and other parts of the comb together in a compact and substantial manner, substantially the same, and for the purpose set forth.

2,901.—G. T. Sawyer, W. Howland, Jr. and T. C. Hatch, of New Bedford, Mass., for Improvement in Setting Stills:

We claim the arrangement of the equal drop flues, D, with the vessel A, connecting flue, E, and chimney, G, as shown and described.

2,902.—L. W. Shaffar, of Shelbyville, Ky., for Improvement in Plows:

I claim the combination of the steel mold board when made as described, the cast-iron standard provided with the flanges on its top, the recess for the point, the projection for holding the brace, the recess on the land side and removable plate, H, to fit the same, with the reversible point, when the whole are constructed and arranged as and for the purposes described.

2,903.—W. H. Smith, of Birmingham, Conn., for Improvement in Breech-Loading Firearms:

I claim the combination with the lever, E, sliding and swinging breech, B, and hammer, F, of the tooth, i, cam, j, horn, k, hooked tongue, f g, and projecting plate, l m, all constructed and arranged as specified and operating in the manner explained to impart a simultaneous movement to the breech and hammer.

[This invention consists in a certain mode of applying a movable breech, either chambered or otherwise to open and close by a movement parallel with the axis of the bore and a swinging movement lateral thereto. Also in certain means of imparting the said longitudinal movement to the breech-serving also as a means of cocking the hammer.]

2,904.—John Tilley, of West Troy, N. Y., for Improvement in Machines for Chamfering Barrels:

I claim the rotary truss rings, B B', when constructed and arranged with the end stocks, C C', mounted together and one or both made movable, all substantially as and for the purpose set forth.

And I also claim the arrangement of the two groove-cutting chamfering knives, J J', and the two score cutting leveling knives, P P', in combination with the apparatus for holding the revolving cylinder of staves with both ends of the staves exposed, as and for the purpose set forth.

2,905.—John and William Toothill, of Wallingford, Conn., for Improvement in Portable Cooking Apparatus:

I claim the two pans, A B, provided respectively with the false bottoms, b g, draught openings, f k, lamp and false side, i, and with or without the lid or cover, E, all arranged as and for the purpose set forth.

[The object of this invention is to obtain a very portable and simple cooking device which may be carried without inconvenience by a soldier, and be capable of ready adjustment for cooking, so that every soldier may be provided with the means of cooking his own rations.]

2,906.—F. W. Weiss, of Mount Vernon, N. Y., for Improvement in Military Cloaks:

I claim the construction of a military cloak or a military coat in the manner described, so as to be capable of conversion at will into an air bed or mattress, substantially as set forth.

2,907.—Henry Weissenborn, of Newark, N. J., for Apparatus for Collecting Zinc from Waste Gases of Furnaces:

I claim separating zinc, through an apparatus, from the waste gases while conducted from the top of a blast furnace to steam boilers or hot-blast oven, in the manner substantially as set forth.

2,908.—J. J. Welling, of Cedar Falls, Iowa, for Improved Device for Weaning Calves:

I claim the jointed curved piece, F, provided with prongs, B, balls, a, spring, d, and standards, e, the whole constructed and operating substantially as and for the purpose set forth.

2,909.—A. H. Wellington, of Woodstock, Vt., for Improvement in Saw Gummers:

I claim the carriage, C, laterally sliding shafts, B D, curve, A, screw J, and spiral spring, f, with the clamps, I, and pivot screw, e, when combined, arranged and operating in the manner described.

[This invention is designed for gumming muley, sash and circular saws, particularly large circular saws, such as are used for sawing lumber, and consists in a simple construction and arrangement of parts whereby the labor heretofore required for the same is greatly reduced and the gumming effected in an easy and expeditious manner.]

2,910.—F. J. Willett, of Nunda, N. Y., for Improvement in Pumps:

I claim the combination of a hand lever, O. and platform, M, oscillating together, when connected with the piston rod, k, of a pump, substantially as described, so that the combined exertions of the muscular power of the arms and the weight of the body, may be employed for working the pump.

I also claim the employment of the disks, m m, in combination with the packing, f, rod, k, and piston cylinder, B', arranged and operating substantially in the manner and for the purposes set forth.

I also claim the combination of the cylinder, A, and pipe or pipes, C D, thimbles, e e, bands, g g, and wedges, h h, substantially as shown and described.

2,911.—U. B. Winchell, of Oak-hill, N. Y., for Improvement in Hold-Back Hooks:

I claim the combination of the cam, projection, or button on the cock-eye or loop, and the recess or recess and slot, in the hook and plate, when operating together in the manner and for the purpose, substantially as described and represented.

2,912.—Peter Wright, of Dudley, England, for Improvement in Wheels. Patented in England May 22, 1861:

I claim, first, The formation of the bosses or naves of wheels, in the manner described.

Second, The mode of combining or connecting together, as described, the several parts of wheels with the exception of that portion of the single disk wheel alluded to.

Third, The manufacture of wheels with cast-iron bosses or naves formed and secured as described.

2,913.—Alfred Delestatius (assignor to Andrew Rankin), of Philadelphia, Pa., for Improvement in Manacles:

I claim the portion, A, of the ring with its rounded projection, f, in combination with the portion, A', of the ring and its projection, e, the whole being constructed and arranged substantially as set forth, so that on closing or opening the ring the two parts will yield slightly and allow the projection, e, to pass over the projection, f.

Second, The spring bolt, D, constructed and arranged within the chamber, c, in relation to the projection, e, substantially as and for the purpose set forth.

Third, The ferrule, q, and its flange, t, arranged in respect to the chamber, c, the entrance, d, to the same, the stem of the bolt, D, and the spring, m, substantially as described for the purpose specified.

2,914.—D. E. Emerson (assignor to Mary Manny), of Rockford, Ill., for Improvement in Harvesters:

I claim the combination of a wheel with the body of a divider for a harvesting machine, in such manner that the wheel forms the front end of the divider, substantially as described.

I also claim the combination of a reciprocating cutter of a harvesting machine with a stiff pitman, by means of a flexible connection at the end of the pitman that is nearer the cutter, substantially as described.

I also claim the combination of the shoe which forms the bearing of the cutter for a harvesting machine with an adjustable guide secured to said shoe, substantially as described.

2,915.—John Magee, of Boston, Mass., assignor to the Norton Furnace Company, of Norton, Mass., for Improvement in Stove Grates:

I claim combining and arranging together the rectangular grate, C, with guard plates, D' D', and the ways, b, so that the grate cannot only be rocked on its pivots, c, but be moved in the direction of its length, substantially as described.

2,916.—E. M. and J. E. Mix (assignors to themselves and John Gauntlett), of Ithaca, N. Y., for Improvement in Padlocks:

I claim the arrangement of the sector tumblers, D, guide pin, k, of the key, F, and the dog, C, substantially as shown and described, for the purpose of admitting the key, F, to be turned in either direction to unlock the lock, and also to prevent the internal parts of the lock being injured by the intersection of false keys, as set forth.

[The object of this invention is to obtain a padlock which may be opened or unlocked by turning the key in either direction, and one which will admit of a false key being turned entirely around within it in either direction without unlocking the lock or injuring the parts thereof.]

2,917.—A. K. Tupper (assignor to himself, J. E. Tupper and J. W. Green), of Pontiac, Mich., for Improvement in Gas Retorts:

I claim the coke box or basket, C, combined with the cover or cap, B, of the retort, substantially as and for the purpose specified.

2,918.—Jacob Widmer (assignor to H. B. Bigelow), of New Haven, Conn., for Improvement in Machines for Cutting Roots:

I claim the adjustable eccentric cylinder, C, in combination with the rotating heads or disks, F G, knives, H, and hopper, B, arranged substantially as and for the purposes set forth.

[The object of this invention is to attain a root-cutting machine which will be simple in construction, economical to construct and to admit of being very expeditiously adjusted or graduated so as to cut the roots to any required degree of fineness.]

2,919.—G. B. Adams, of Cambridge, Mass., assignor to himself and James M. Stone, of Charlestown, Mass., for Improvement in Supporting Tents:

I claim supporting a tent cover on a center pole by means of detached braces whose inner ends are held and made by means of shouldered recesses on aid center pole, and whose outer ends pass through the grummet holes in said cover, as represented and for the purpose set forth.

RE-ISSUES.

140.—C. Aultman and L. Miller, of Canton, Ohio, for Improvement in Mowing Machines. Patented July 17, 1856. Re-issued July 19, 1859:

We claim mounting the two driving wheels and one main gear wheel upon a common axle, in combination with a ratchet wheel for each driving wheel, each ratchet wheel fitted with a pawl that can be made to stand in or out of gear with the ratchet teeth at will, the whole arranged and operating substantially as described.

141.—C. Aultman and L. Miller, of Canton, Ohio, for Improvement in Mowing Machines. Patented July 17, 1856. Re-issued July 19, 1859:

We claim, in combination with a hinged finger bar and cutter, a stop which, when the finger bar is raised up will prevent the cutter from dropping out of its bearings, substantially as described.

138—S. B. Sexton, of Baltimore, Md., for Improvement in Stoves. Patented April 19, 1859. Re-issued Dec. 3, 1861:

I claim a fuel supply chamber suspended within or above the fire box, with its lower end out of contact with the latter, by connections which shall be out of contact with the burning fuel, and shall permit the free circulation of gases around and above the supply chamber.

I also claim a cold-air chamber combined in any manner substantially as described, with a fuel-supply chamber so applied as to permit the passage of the products of combustion around and above it.

I also claim the combination of the main chamber, A, fuel chamber H, flues, C B E B' D, and damper, b, arranged and operating substantially as explained.

NOTE.—The above list of patents, issued on the 10th inst, numbers *fifty-three*. This is the result of the business of the Patent Office for one week. Among the above we recognize the names of TWENTY patentees whose specifications and drawings were prepared at this office. —EDS.

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NEW YORK MARKETS.

There has been a very great rise in the price of cotton since our last market price table was published on page 300. Then prices ranged from 18½ to 23½ cents per lb.; now they range from 38 to 40¼ cents per lb. Domestic cotton goods are rising in price with the rise of the raw material. The best qualities of flour have advanced fifty cents per barrel. Saltpeter, which is used for making gunpowder has become very scarce and has doubled in price—from 8 to 18 cents per lb.—in four weeks. By the latest news from Europe we learn that saltpeter was prohibited from being exported to America, and one vessel that was loading with it had been ordered to unload her cargo.

The markets are very fluctuating, and common reports of prices are unreliable.

Notes and Queries

J. B. W., of Mass.—Try hot chloride of lime in bleaching saw-dust white. The resin contained in pine wood saw-dust will tend to resist the action of the chlorine. We have seen pine wood bleached with a warm solution of chloride of soda. Kauri-gum is also sold under the name of New Zealand and Australian gum. It is a coarse, natural resin, found under the soil in Australia and New Zealand, and is supposed to have been the exudation of trees belonging to an ancient pre-Adamite forest.

H. B. .B., of Mass.—All the information we can furnish on tempering tools, we are now publishing in articles and will complete them in a few weeks.

A. M., of N. Y.—Do you mean to say that in your operations of amalgamating gold, the separation of the gold from the mercury "is sometimes almost impossible?" You employ the term "ore,", we suppose it should be gold. In retorting amalgamated gold the process should be conducted under a very limited pressure and not too rapidly, as the mercury when it volatilizes quickly always carries over some gold with it, but we never heard before that any difficulty was experienced in volatilizing all the mercury.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Dec. 18, 1861 :—

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